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Robt. Burnett

OBSERVATIONS

ON THE

SCURVY.

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OBSERVATIONS

ON THE

SCURVY;

WITH A REVIEW OF THE

OPINIONS

LATELY ADVANCED ON THAT

DISEASE,

AND A

NEW THEORY DEFENDED,

ON THE APPROVED METHOD OF CURE, AND THE INDUCTION OF PNEUMATIC CHEMISTRY:

BEING AN ATTEMPT

TO INVESTIGATE THAT PRINCIPLE IN RECENT VEGETABLE MATTER, WHICH, ALONE, HAS BEEN FOUND EFFECTUAL IN THE TREATMENT OF THIS SINGULAR DISEASE; AND FROM THENCE TO DEDUCE MORE CERTAIN MEANS OF PREVENTION THAN HAVE BEEN ADOPTED HITHERTO.

II. EDITION.

By THOMAS TROTTER, M. D.

MEMBER OF THE ROYAL MEDICAL SOCIETY; AN HONORARY MEMBER OF THE ROYAL PHYSICAL AND OTHER LITERARY SOCIETIES OF EDINBURGH; AND SURGEON OF HIS MAJESTY'S SHIP THE DUKE.

Multum egerunt qui ante nos fuerunt; multum etiam, adhuc reſtat operis, multumque reſtabit. SEN. EPIST.

LONDON:

PRINTED FOR T. LONGMAN, PATERNOSTER ROW; AND J. WATTS, GOSPORT.

M.DCC.XCII.

TO THE RIGHT HONORABLE

RICHARD, EARL HOWE,

ADMIRAL OF THE FLEET.

MY LORD,

WHEN I did myſelf the honor to ſolicit your patronage to the firſt Edition of theſe Obſervations on the Scurvy, it was from a real conviction that they might

might be of ſome benefit to that department of the public ſervice, over which your Lordſhip then preſided as firſt Lord Commiſſioner of Admiralty. About that time a diſpute had ariſen among phyſicians concerning the Theory of Scurvy, which, I believe, to this day, though variouſly ſupported, has been undecided. But the opinions of ſome Authors, who have intereſted themſelves in that diſcuſſion, appeared to me as introducing a method of treatment in the diſeaſe, not founded on pro-

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per notions of its nature, and by no means ſanctioned by experience. It, therefore, became the duty of thoſe whoſe practice had taught them to think otherwiſe, to guard againſt haſty concluſions, however plauſibly defended; and I feel much ſatisfaction in having directed my attention to an inquiry ſo important.

What may be conſidered as original in this undertaking, is an attempt to reconcile what has been called the Theory of the Diſeaſe with

with the general and approved method of cure; or, literally, to explain thoſe properties of recent vegetable matter, which reſtore to the body the principle that had been abſtracted by the ſea diet, or other cauſes of Scurvy. To the labours of modern chemiſts we are indebted for this explanation. With regard to the Prevention and Cure, if little is added to what was known by our predeceſſors, I have endeavoured from the general ſtock of facts on the ſubject, to point out a better mode of inveſtigation than has been done hitherto. On the whole,

whole, much is left to future obſervation; we ought not yet to be ſatisfied with our knowledge of Scurvy; for in this, as in many parts of medicine, the wiſeſt and oldeſt will be ſtill at ſchool.

That you may long enjoy health, and continue an ornament to the Britiſh Navy, is the earneſt prayer of,

My Lord,

Your Lordſhip's

Moſt obedient,

And devoted humble ſervant,

THOMAS TROTTER.

DUKE, Portſmouth Harbour,
Jan. 12, 1792.

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INTRODUCTION.

WHEN I was attending Lectures at Edinburgh, in the winter of 1784-5, the doctrine of Putrefaction in the human fluids, the laſt remnant of a Humoral Pathology, was at this time the general ſubject of diſcuſſion in the different Medical Societies. Dr. Milman's Enquiry had been lately publiſhed, and the Theſis of Dr. Ferris, who oppoſed the new doctrine of debility, and contended for the putreſcency of the blood, had been printed only the September before.

The opinions of Dr. John Brown were now in their full vigor, and ably defended by ſome ingenious young phyſicians then ſtudents at the College. This doctrine, the rival to that of Doctor Cullen, more ſuited to captivate the imagination than to inform the judgment, was alſo better adapted to dazzle the fancy of a ſpeculative mind, than to clear the doubts of the practical phyſician. To the ſtudent it was faſcinating, ſimple, and complete; but the impoſſibility of reducing its precepts to ſick-bed experience, made the deliberate obſerver of facts cautious of its application. Men accuſtomed to ſee the futility of reaſoning on medical ſubjects, where it aſpired beyond bounds, could not fail to be ſuſpicious of ſo much ſelf-ſufficiency, when they ſaw the moſt ſanguine of its followers now and then alarmed at the aggravation of a ſymptom or diſappointed in a cure: by aiming at too much it loſt every thing. Though

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the Author was himſelf well verſed in the ſiſter ſciences of medicine; he not only diſclaimed their aſſiſtance but deſpiſed their utility: ſuch didactic harangues from the mouth of a teacher, were conſidered as hereſies in phyſic, and outrageouſly abſurd. Satisfied in his own opinion, that he had reduced a conjectural art to a demonſtration, he mocked the pious deluſions of antiquity; and fulminated from his deſk, his dogmas of proſcription againſt the whole faculty of medicine: it was in theſe rapturous excurſions of his enthuſiaſm that he conſecrated himſelf the prieſt of Apollo, and dealt from his tripod, the benediction of *age et vince* to his pupil, when he ought to have ſaid, "*parce puer ſtimulis.*"

Many parts of the new doctrine, however, are ſecure from cenſure: where the exuberance of genius did not betray him into faults, he ſucceſsfully ridiculed the technical iniqui-

ties of faſtidious profeſſors; but though he could occaſionally point the ſhafts of ſatire with dexterity againſt the opinions of a literary adverſary, yet he wanted the virtues of prudence and moderation to improve his victory. It was the triumph of a ſchool-boy, and unworthy of a philoſopher. He will have the credit of introducing into the practice of phyſic a more liberal uſe of ſtimulants, and the more general exhibition of active remedies than any of his predeceſſors. As he founded his ſyſtem on that of Dr. Cullen, ſo he excluded from it ſome imperfections that have been ſaid to disfigure its cotemporary; and had it been broached with as much diffidence, and defended with equal modeſty, it would not have failed to extend the fame of its Author, as it would itſelf to the benefit of mankind. It remained for a long time inacceſſible, even to the learned, from the affected Latinity in which it was delivered; and it was not till a

ſhort

ſhort time before his death, that Dr. Brown was obliged to deſcend from quaint ſuperlatives and obſolete verbals to modern Engliſh.

The illuſtrious phyſician who now fills the practical chair of Edinburgh, will, it is hoped, reſcue from oblivion the unexceptionable parts of the new doctrine, both as uſeful and ornamental to ſcience.

Doctor Milman's publication was looked upon as an acceſſion of ſtrength to thoſe who oppoſed the tainted ſtate of the blood as the proximate cauſe of ſcurvy; but it was alſo looked upon and claimed as the offspring of the Brunonian doctrine. Dr. Cullen, though he had ſeen as little of the diſeaſe as Dr. Milman, could not be prevailed upon to relinquiſh all at once the only ſhare of the Humoral Pathology which his ſyſtem retained. If he was miſled,

led, it was certainly from the erroneous records of writers on the ſubject.

The hiſtory of this great man's opinions, forms an important epoch in medicine and philoſophy. Nor merely becauſe his doctrines atchieved a revolution in medical ſcience; but "*nullius addictus jurare in verba magiſtri*," he taught us how to think for ourſelves, pointed out a method of inveſtigation unknown to our predeceſſors, and ſeemed to have been the firſt Phyſician who received nothing gratuitouſly, or what was not ſupported by rational induction.

Poſſeſſed of a genius quick of apprehenſion, original and univerſal, he ſeemed formed by nature for the ſtudy and practice of an art, that muſt ever in ſome degree be conjectural, where ſo large a field is left for ingenuity to explore; and for the knowledge of which, a thorough acquaintance

quaintance with the auxiliary branches of ſcience is ſo highly neceſſary.

A mind ſo richly endowed, ſoon perceived the imperfections of the reigning ſyſtems of Phyſic; and his firſt Clinical Lectures in the Royal Infirmary of Edinburgh, ſtaggered the faith of thoſe Phyſicians and Profeſſors, who thought that the doctrines of Boerhaave could neither be refuted or admitted of improvement.

This arduous taſk he lived to accompliſh.—Hoffman had before ſaid, that univerſal Pathology was to be more certainly and eaſily explained,—*ex vitio motuum, micro-coſmicorum in ſolidis quam ex variis affectionbus vitioſorum humorum*; on which Dr. Cullen founded his principles, and hence the overthrow of the Humoral Pathology.

It was left to him to finiſh the work, to beautify the whole, and poliſh it into ſyſtem: and while the diſciples of the Boerhaavian ſchool were accumulating ſuppoſitions on *lentor* and *acrimony*, and ſtraining facts to confirm the doctrines of their maſter, the ſpirit of Cullen aroſe. Bold, acute, penetrating, and comprehenſive; fraught with all the reſcources of originality, to correct prejudice, develope error, or enlighten diſcovery, he trod beneath him the dominion of authority, that ſubdued the energy of enquiry: not like the plodder in ſcience, he ſelected only from the labor of ages, what was ſuited to the dignity of his ſubject, and the greatneſs of his purpoſe; and finally, he turned the tide of ſearching for the proximate Cauſes of Diſeaſes from the fanciful hypotheſis of a depraved ſtate of the fluids, to its proper channel,—the more rational and refined inveſtigation of a vital principle, and the primary moving

powers

powers in animals. Before he came to the practical chair, he had been Profeſſor in all the other branches of medicine; and what he ſays of Boerhaave may be well applied to himſelf;—he excelled in each, and was certainly a candid and genuine *eclectic*.

In the exerciſe of a profeſſion, where genius alone can be ſucceſsful, and which no rules can ſupply, the vigor of his judgment and ſolidity of his underſtanding were ſingularly conſpicuous. It was that accurate collecting of ſymptoms, that acuteneſs of apprehenſion, which, as if by intuition, catched the leading features of his patient's conſtitution and diſeaſe, that in forming a prognoſtic, ſo often the bane of medical reputation in private practice, he was ſeldom miſtaken. But amidſt all theſe ſplendid talents and tranſcendent abilities, the philanthropy of his heart, and the urbanity of his manners, will be

long remembered by his numerous pupils. As long as his health permitted, a day in the week was ſet apart for converſing with ſtudents; in this, perhaps, we ſee an exalted character in the moſt amiable point of view, where the auſterity of the preceptor is laid aſide to communicate knowledge through colloquial ſociety. He ſtudied the profeſſion, as he ſaid, *con amore*, and he rejoiced to inculcate the love of it in others: by theſe means he became the favourite Profeſſor, and darling among ſtudents; witneſs the affectionate addreſſes from the different ſocieties when he reſigned the practical chair, and the eulogies on his character to be found in the Inaugural Diſſertations of his pupils.

In medicine, changes and revolutions may be progreſſive; but the outlines of his ſyſtem will remain, whatever may be added from the induction of freſh facts and experiments. The love

love and ardor of the ſtudy which his example has excited, will be long preſerved in the Royal Medical and Phyſical Societies, and will deſcend to poſterity. The tyro in the art will there find his labours encouraged and ſtimulated by the freedom of debate; and the young phyſician who delivers his opinions with candor and modeſty, will be heard and approved, in ſpite of the captious petulance of his ſenior, who, grown grey in error, too often deſpiſes conviction from a youthful opponent.

Hearing at this time ſo much ſaid on the ſubject of Scurvy, a diſeaſe that I had lately treated in a multitude of caſes, I began to think that there were many valuable facts in my poſſeſſion that might go a great way in deciding the diſpute; I was, therefore, induced to put ſome of my remarks together, and when Doctor Cullen, in the courſe of his lectures, came to treat on

Scurvy, a copy of them was tranſmitted to him, with the name of the author, according to cuſtom: on receipt of them, he was pleaſed to declare next morning, "That he never came to "that chair ſo badly prepared; that after the "Scurvy had been treated by different authors "for two hundred years, he doubted much if we "had yet acquired a ſtock of facts ſufficient to "enable us to form proper notions of its na-"ture; but that he would conſider a paper on "the ſubject which he had received from a gen-"tleman preſent, which was the cauſe of him "making this declaration." He, however, reſumed his lecture the day following without taking farther notice of my letter. What had particularly excited his ſurpriſe, was the diſeaſe occurring among Negroes in an African ſhip while living on a vegetable diet of unfermented *farinacea*, which he found not to be eaſily reconciled to his opinions on the proximate cauſe.

Theſe

Theſe caſes were new to both ſides of the queſtion, and certainly offer ſome of the ſtrongeſt facts againſt the doctrine of the ſolids.

The Declaration from Dr. Cullen, nevertheleſs, prompted me to arrange the matter in ſome methodical order, which was accordingly done in a form intended for the diſcuſſion of the Medical Society. In nearly that form it was afterwards publiſhed; it not coming to my turn to furniſh papers for that ſeaſon. The ſupporters of the Brunonian doctrine, then in the Society, were ſome of the moſt diſtinguiſhed for abilities that had ever been educated at the Medical School of Edinburgh; but the flight of genius carried them beyond a cool and deliberate inveſtigation. It ſounded ſtrange in the ears of a navy ſurgeon to hear that the ſcurvy could be beſt cured by a diet of ſolid animal food, brandy, and opium. But beſides their own plauſible reaſoning on the

the ſubject, they produced the beſt authorities for theſe modes of practice; and the debility of the digeſtive powers, with deficient nouriſhment, as held out in Doctor Lind's Treatiſe on Scurvy, were conſidered as the ſtandard of truth, and the umpires of diſpute.

This worthy man and learned phyſician, had been a ſurgeon in the navy himſelf, and ſeen the diſeaſe, as it is uſually met with in ſhips of war in all circumſtances and ſituations. The leading *trait* of his profeſſional character has marked him the man of obſervation. When he firſt publiſhed his book, he had, no doubt, many authors to conſult; but their facts were often diſtorted, their theories abſurd, and their practice empirical, ſo that much was left to himſelf; and when he came to be a phyſician to Haſlar Hoſpital, he ſeems to have ſoon formed his opinions. Of great medical abilities that have

attended

attended military ſervices, the army of this country can boaſt of a Pringle, a Cleghorn, and Munro, and ſome others who have written ſince laſt war; but the name of Lind ſtands alone in the navy. Amidſt the few advantages his ſituation afforded him for ſtudy, the ſpirit of obſervation never forſook him; and his works comprehend the beſt hiſtory of climate that has yet been produced.

What is to be offered in theſe Obſervations againſt the opinions of Doctor Lind, ought to be conſidered as the reſult of a larger ſtock of facts, accumulated on the ſubject of Scurvy ſince his publication. "In every branch of "ſcience, ſays Dr. Cullen, with reſpect to "which new facts are daily acquired, and theſe, "conſequently, giving occaſion to new reflec- "tions, which correct the principles formerly "adopted; it is neceſſary, from time to time, to

"reform

" reform and renew the whole ſyſtem, with all " the additions and amendments it has received " and is then capable of." The neceſſity of recording facts muſt be obvious to every one. The firſt edition of this work was printed in the end of 1785; but written at a period of life when few people think of giving their opinion on practical ſubjects in medicine; it contained many of thoſe errors, which follow the ardor of juvenile inquiries; and which now, from more experience and reflection, I ſhall not heſitate to retract as occaſion may offer. The facts, however, as there related, have been thought no inconſiderable acquiſition to our knowledge of Scurvy; a late writer on the diſeaſe had found ſome parts of it ſo much to his purpoſe, as to borrow a few pages, without allowing me the credit of an *inverted comma*.

Many alterations with a conſiderable number of recent facts are added in this ſecond edition.

In

In the former I found the doctrine of putrefaction untenable, and in this I have deserted it altogether. This being the case, my arguments are much extended against Doctor Milman's conclusions; and a new proximate cause defended on the approved method of cure, and the induction of pneumatic chemistry, is, for the first time, offered. It may perhaps be said that theories in medicine are only innocent reveries; for it is enough if we can cure a disease: such reasoning needs no serious reply; the human mind, in all ages, has been desirous of investigating causes where it saw effects. But if ever there was a necessity of deciding any point in medical controversy it is the one at issue among us: let us only suppose a young man just come from the University, where he had taken the opinions of Doctor Milman for his guide in the treatment of Scurvy.—He had been there taught that Scurvy at sea is caused by an indigestible

diet, which by affording no nouriſhment to the body, reduced it to a ſtate of debility which produced the diſeaſe. If theſe were the ideas he had formed, inſtead of having recourſe to the juice of lemons, other acid fruits, or any freſh vegetables, he would immediately preſcribe, if it could be got, animal food, wine, and other reſtoratives; none of which, we know, can cure the Scurvy; but theſe articles he had been taught, were the beſt to reſtore a debilitated ſtomach and conſtitution. This reaſoning is not mere allegory, for it has been often made uſe of. Such notions ought, therefore, to be corrected at once; for it is well known with what reluctance many of us part with opinions we had formed early, and been accuſtomed to revere. I thus contend for the importance and propriety of the diſcuſſion which I have provoked, and ſhall preſerve my opinions as long as I am convinced by matter of fact only. The

theory

theory which is here offered will have to recommend it, that it holds out no new method of cure, ſupported by partial obſervation; but tends to confirm the old, and lead the way to a more certain practice than has hitherto been done. What has been ſaid on the Prevention as well as Cure, we have endeavoured to explain as much as poſſible, in order to render the whole of practical utility. It is the ſpirit of true philoſophy to deduce every thing from fundamental principles, and to advance nothing that cannot be defended on theſe. We have had recourſe to modern chemiſtry in many of our explanations, and have employed it in a manner entirely original and new to the doctrines of Pathology and Therapeutics. The preſent æra of chemiſtry has unfolded a treaſure of knowledge, at which the philoſophic mind is aſtoniſhed, and the ardor of enquiry and experi-

ment is only to terminate with the remoteſt arcana of natural bodies.

As I ſtill conſider the ſubject incomplete, thoſe gentlemen who will favor me with any communications from their practice in the diſeaſe, will much oblige me. Doctor Lind, to whom theſe addreſſes were formerly ſo juſtly due, is now ſo enfeebled with age, that he cannot give them that attention he could otherwiſe wiſh. At a future period I hope to be able to add ſome valuable information from the Settlement of New South Wales, and the ſhips that are gone on diſcoveries.

Many apologies are wanted for the inaccuracies in both matter and language, which may have eſcaped me in this Work. In a ſituation ſo liable to interruption, it is in ſome meaſure unavoidable

unavoidable. At a diſtance from a well ſtored library and literary friends, it will not have the advantages which uſually accompany publication: it can only derive credit from the facts it contains.

The Author of theſe Obſervations at the end of the laſt war, by no proviſion being made for the junior part of the Surgeon's Liſt, was the firſt man of his *corps* who had to embrace the painful alternative of embarking on an African voyage. Much of the information contained in theſe pages, was the reſult of his practice in that voyage: to find that it is of any ſervice to medical ſcience, will, in ſome degree, repay him for the unpleaſant months he ſpent in the unhallowed trade; and the ſufferings of his conſtitution from an unwholeſome climate. Since that time it has been peculiarly his province

vince to explain to the firſt Lord of the Admiralty, the imperfections of the medical eſtabliſhment in the navy; not merely in point of emolument to the ſurgeon; but in ſerious circumſtances that relate to the health of ſeamen, and which call for a general reform on the principles of modern improvements in medicine. The Author is happy to acknowledge the approbation which the tribunals of literature beſtowed on his plan. It was certainly remarked with much juſtice, "The medical department in the navy, "although it ſpeaks but little in the praiſe of the "wiſdom of thoſe who planned it, is certainly "an excellent proof of the patience of their "poſterity, who have ſo long ſuffered it to "remain unimproved. It was bad at its firſt "inſtitution, and has been gradually growing "worſe." * Whatever may be elſewhere the ſucceſs of an attempt to reform the medical de-

* Monthly Review for June, 1790.

partment

partment of the navy, it is no ſmall ſatisfaction to think that it has been favourably received by thoſe who have ſome pretenſions to decide in ſubjects of ſcience.——

Sic me ſervavit Apollo!

OBSERVATIONS

ON THE

SCURVY.

SECTION I.

The History of Scurvy.

THE Hiſtory of Scurvy, like that of many other diſeaſes, is ſtill imperfect and obſcure; and it is, perhaps, more a matter of curioſity than of any real practical utility, to inquire and decide, whether it was known and deſcribed by the ancient phyſicians. Much

learning and extenſive knowledge of the writings of antiquity, have been beſtowed on this ſubject; but though the arguments deduced from them are ſpecious, they are not convincing and ſatisfactory. It is a ſuppoſition too fanciful for medical reaſoning, to reconcile the *Splen Magnus*, and *Convolvulus Sanguineus* of Hippocrates, with what is called the Scurvy. Certainly, bowel complaints are not eſſential attendants of Scurvy; and thoſe ſymptoms by which he deſcribes the affections of the ſpleen, are vague and inconſiſtent. Although the diſeaſe has been produced in every climate from almoſt the ſame cauſes; yet, aſſuredly, a warm latitude, where vegetation is neither checked or deſtroyed by the froſt of a ſevere winter, but pours forth her abundant luxuriance throughout the year, would be equally favourable for the prevention, as it is known to be for the cure. Thus it is not likely to have ever made its appearance in the Southern climates of Europe: theſe regions all abound with the acid fruits, which are the beſt antiſcorbutics;

antiſcorbutics; and the cravings of nature in this diſorder are ſo ſtrongly marked, that ſo accurate an obſerver of the propenſities of appetite as Hippocrates was, could never overlook ſuch longings and deſires in his patient, had he ever ſeen the Scurvy. Theſe arguments all operate againſt the concluſion, that the diſeaſe was known to the Greek and Arabian phyſicians. Hence, in latter times, the firſt accurate accounts of its cauſes and appearance, which are to be met with, are from the ſhores of the Baltic, where the inhabitants were obliged to live very much on ſalted fiſh and beef, and where their vegetables uſed in diet were deſtroyed by long and rigorous winters: the ſame cauſes continue to produce Scurvy in theſe cold countries to this day. But as Commerce began to expand her wings, and a new world was diſcovered, ſea voyages became longer, and more unhealthy. The nations of Europe, particularly the French, Spaniards, and Engliſh, have of late made their tranſ-atlantic poſſeſſions the ſcenes of their

warfare. Thus, all thoſe powers have occaſionally kept up vaſt armaments by ſea and land, for the defence of their colonies; and from the neceſſity of ſupplying their ſeamen with ſalted proviſions, without vegetables, the Scurvy has been the moſt conſtant diſeaſe and fatal attendant of a ſea life during every war. From theſe ſources we have derived our preſent improved ſtate of knowledge concerning it; and Doctor Lind's Work will remain a valuable legacy to the naval ſervice of Great Britain, as it will be a laſting monument of the Author's induſtry and abilities.

The meaning and derivation of the word itſelf, have alſo attracted much attention from the favourers of its antiquity. I am perfectly of opinion with Doctor Lind concerning its Sclavonic origin. The firſt accurate account of the diſeaſe certainly came from the northern countries of Europe; from which we are led to believe, that there alſo it acquired the name

that

that it ſtill bears. What value the authority of antiquity may confer on the Hiſtory of Diſeaſes is not to be diſputed here; but the labours of theſe gentlemen ſeem to have been as much miſapplied, as thoſe of others were, in exploring the *Herba Britannica* of the Roman Naturaliſt, (celebrated for having cured the diſeaſe in the Roman army); for we do not find in the writings of the ancient phyſicians, any thing worthy to be ſought after, either in the hiſtory of the ſymptoms, or cure of Scurvy.

Modern Noſologiſts have been at much pains to give us a clear DEFINITION of *Scorbutus*. Doctor Cullen adopting the idea of its being only found in cold climates, begins with the words "In Regione frigida." This ought to be left out; cold, no doubt, aſſiſts the operation of the exciting cauſes; but it is now well known that Scurvy is to be met with in every

every latitude. He goes on, "poſt victum "putreſcentem, ſalitum ex animalibus confec- "tum." The Doctor was of opinion that Scurvy only followed the uſe of ſalted proviſions, or even animal food without freſh vegetables. There are many caſes on record where the diſeaſe followed other kinds of diet. It is a very common complaint in the country ſhips in the Eaſt Indies, where the religion of the natives obliges them to live at ſea on rice; but they are always recovered by freſh fruits when they return to port. In theſe Obſervations we ſhall add many caſes, from ſimilar cauſes, to confirm the ſame thing. The following definition is offered as being agreeable to our preſent ſtate of knowledge concerning the remote and occaſional cauſes:—

> Aſthenia, ſtomacace, in cute, maculæ diverſicolores, plerumque liveſcentes; deficiente ſimul vegetabili materie recente, eundemque vehemente ingerendi deſiderio.

Many

Many ſpecies and ſubdiviſions of Scurvy are to be found in the writings of phyſicians, which originated in the imperfect chemical knowledge of the animal fluids; and the pretended cauſes vaguely aſſigned for its production in the earlier records of medicine; but theſe are inconſiſtent with modern Pathology, and our preſent ideas of the animal œconomy. We are now well aſſured that there is but *one Scurvy*; the ſame in its ſymptoms, however, at different times variouſly produced; and the ſame method of cure is equally to be purſued, whatever were its cauſes.

In enumerating the *remote cauſes* of Scurvy, authors have very generally divided them into occaſional and prediſpoſing. From the remarkable circumſtance of this diſeaſe occurring after the uſe of a peculiar kind of diet, Doctor Cullen has aptly termed the occaſional cauſes the antecedents of Scurvy.

This

This diſorder is moſt frequently met with at ſea: few ſhips in any climate, after being eight or ten weeks from port, eſcape the Scurvy, if the crew are obliged to live on the common allowance of ſalt proviſions, with no freſh vegetables. Certain prediſpoſing cauſes, however, concur to haſten the appearance of its ſymptoms. At land it is alſo produced by the ſame means; and beſieged garriſons on many occaſions have ſuffered extremely from this complaint; ſuch was the caſe with Fort St. Philip at Minorca, and that of Gibraltar, while blockaded by the Spaniards laſt war. But it is particularly owing to the ſcarcity of *recent vegetable matter*; and where it abounds the diſeaſe is unknown.

Among the *prediſpoſing cauſes* are chiefly to be remarked; damp, marſhy ſituations, fogs, or rainy weather; cold weather from climate or ſeaſon. At ſea thoſe particularly liable to it, and whom it generally affects firſt, are ſeamen weakened

weakened by preceding diſeaſe, and in a convaleſcent ſtate too ſoon put upon the common allowance of the ſhip. The lazy, inactive, and ſlovenly people, called the ſkulkers, become the certain prey of the Scurvy. Thus it is that impreſſed men, and raw landmen are ſo early affected. Fatigue from whatever cauſe; hence its appearance in our ſhips of war, is often after hard gales of wind, where the crew had been much fatigued with the neceſſary duty on deck during tempeſtuous weather. Perſons of what is called the melancholic temperament are peculiarly prediſpoſed to Scurvy whenever expoſed to its exciting cauſes; and if it is true that hypochondriacal affections are confined to that temperament, we may allow ſome excuſe for authors having now and then confounded them together: in ſuch conſtitutions, the ſymptoms of timidity and deſpondency are obſerved in a degree beyond common; but as far as my experience goes, without any ſigns of dyſpepſia, which pro-

perly characterize the hypochondriacal diſeaſe. To all theſe cauſes now mentioned, is to be added impure air; and, in ſhort, whatever can be conſidered as a debilitating power when applied to the human body, may be juſtly reckoned among the prediſpoſing cauſes of Scurvy.

In forming a *Diagnoſis* of Scurvy there is but little danger of confounding it with any other diſeaſe. The preceding kind of diet, or what is called the antecedents; the ſituations in which it ſo generally occurs, as at ſea; ſo many ſymptoms peculiar to itſelf, and the definition we have given it, will all ſerve to direct the practitioner in forming his diagnoſtics.

Different ſpecies of cutaneous eruptions, even among medical men, ſtill paſs for ſcorbutic, as being peculiar to certain conſtitutions: they are however, of a very contrary nature; ſuch a term as a *ſcorbutic habit* is founded only on obſolete theories, and we hold it altogether fanciful.

As

As a methodical plan has been adopted throughout this Work, in narrating the ſymptoms, I ſhall divide them into two ſtages; the mild and inveterate: the *incipiens et inveteratus* of authors. Doctor Lind has an intermediate degree, for the purpoſe, as he ſays, of relating thoſe that are more caſual; proceeding not ſo much from the genius of the diſtemper, as from other circumſtances. I ſhall not, however, attempt to explain any ſymptom that may be ſaid to ariſe from *idioſyncraſy*; at beſt, it muſt be conjectural; for no part of the animal œconomy is involved ſo much in obſcurity as theſe cauſes which modify their operation with ſuch variety in the ſame diſeaſes, in different perſons.

I. It is, I believe, very generally remarked in a long voyage at ſea, when the ſtock of vegetables is conſumed, that there is a conſtant craving and longing deſire for freſh vegetables, particularly the acid kind, for pure water, and

independent of the anxiety which may be excited by the wiſh of accompliſhing the buſineſs of a voyage, there ſeems alſo a deſire of being on land, and is connected with a ſtate of body at the time. I have uniformly obſerved it the harbinger of Scurvy. Dr. Lind, in ſome part of his Work, has mentioned this circumſtance; but I conſider thoſe longings as the firſt ſymptoms and the conſtant attendants of the diſeaſe in all its ſtages. The cravings of appetite, not only amuſe their waking hours, with thoughts on green fields, and ſtreams of pure water; but in dreams they are tantalized by the favourite idea; and on waking, the mortifying diſappointment is expreſſed with the utmoſt regret, with groans, and weeping, altogether childiſh. It is curious to hear them in converſation with one another on theſe ſubjects; I have remarked it as earneſtly conducted, as we ſometimes obſerve hypochondriacs in relating their feelings, from any ruffle of temper occaſioned by changeable weather, or other ſlight cauſes. When I heard

heard a ſailor expreſſing theſe deſires, and lolling in corners from the ſight of his officers, there was always an expectation of his being added to the liſt of ſcorbutics in a few days. This ſcorbutic Noſtalgia, "in abſentibus a patria, vehe- "mens eundum reviſendi deſiderium," belongs to the ſecond ſpecies of Doctor Cullen's Genus.

About this time the colour of the face is changed, and even other parts of the ſkin grow ſallow; the cheerful look of the eye, puts on the dull heavy melancholy, and the whole countenance is, as it were bloated. An univerſal laſſitude prevails not to be refreſhed by ſleep; feebleneſs of the joints of the knees and arms; pains all over the body, often worſe in bed, particularly in the ſhin bones, which reſemble venereal pains. The patient if he attempts to do any thing is ſoon fatigued; he grows inactive, his ſpirits flag; he flies into hiding places from his duty, broods over his own feelings in ſolitude, and indulges the moſt gloomy

gloomy ideas of his ſafety, as if hypochondriacal. To theſe ſymptoms generally ſucceeds the ſoftneſs of the gums, which ſo eſpecially characteriſes Scurvy; they ſwell, grow ſpongy, and bleed from the ſlighteſt cauſe. The breath is fœtid and diſagreeable, and often attended with ſome unpleaſant taſte of the mouth. The ſurface of the body is dry and rough to the touch, the pores of the ſkin are evidently conſtricted, and the patient feels the external air colder than uſual. Some degree of tightneſs is felt about the breaſt; a difficulty of reſpiration alſo takes place on uſing exerciſe, but commonly inconſiderable in this ſtage.

All the ſymptoms now mentioned, in ſome caſes increaſe rapidly; while in others they make little progreſs even for weeks: but this depends on the ſtate of the body, and the nature of the diet in uſe; nor are they by any means regular in ſucceſſion. In one perſon it ſhall be firſt known, from the ſurface of an ulcer being covered

vered with a portion of craſſamentum, which is ſoft and fungous, and on being ſeparated a ſimilar ſubſtance is ſhortly produced: the ſailors call this ſpongy maſs the *bullocks liver*, which it reſembles in colour and conſiſtence. In other caſes we ſee it begin, with ſwellings of the lower extremities, which retain the impreſſion of the finger: ſometimes a hardneſs of the muſcles will appear before any other ſign of the diſeaſe; particularly a degree of rigidity and contraction of the ham-ſtrings. This ſymptom often deprives the patient of the uſe of his limbs, and will remain in ſome caſes for weeks after every complaint has diſappeared. The Scurvy however ſoon expreſſes itſelf by its more general attendants, as the livid ſpots, bloated looks, ſpongy gums, &c.

II. As the Diſeaſe advances, the laſſitude, languor, and debility become more conſiderable; the pains in different parts of the body more ſevere. The reſpiration is oppreſſed on the ſlighteſt

ſlighteſt exertions, with a proneneſs to faint in an erect poſture, and on being expoſed to air colder than the temperature they had juſt before breathed. It is not uncommon for ſailors affected with Scurvy to walk upon deck, and drop down irrecoverably; though to outward appearance when below there ſeemed no danger. A carpenter's mate in the Berwick, got out of his hammock without any aſſiſtance; while putting on his jackets as he ſtood, he grew faintiſh and fell down: the people about him inſtantly opened the port, as they thought, to give him free air, when he immediately expired. The fetor of the breath now becomes intolerable: pieces of the gums, or cloats of blood, like ſpongy fleſh, fall out of the mouth: the teeth are looſened in their ſockets, and frequently drop from the jaw bone, while the patient is eating: as the gums decay a ſalivation comes on. The ſpots on the ſkin increaſe rapidly in ſize, and their colour is variouſly modified, from yellow to a livid hue, by effuſions of blood in the cellular texture.

texture. Every ſlight ſcratch or diviſion of the ſkin, is apt to degenerate into a foul ulcer, and old cicatrices are apt to break out afreſh. Hemorrhagies are now frequent from different parts of the body; but particularly from the noſe, or from the ulcers: though the loſs of blood has been ſmall, there are many inſtances, where it ſeemed to haſten the death of the patient, which has happened immediately after.

The belly is generally coſtive; but diarrhæas, and even fluxes are not uncommon. The urine, as might be expected, is highly coloured; the diſeaſe, in its moſt inveterate degree, happens when water is ſcarce; therefore, for want of dilution, the urine is ſmall in quantity, and acrid. Nothing ſatisfactory is to be learned from the ſtate of the pulſe; but is often to be felt regular a very ſhort time before death. The mind in the beginning as has been remarked, and throughout the diſeaſe, is timid, anxious, and deſponding; but towards the fatal period, there

is generally a total indifference and ſeeming torpor of every faculty. The appetite for food in every ſtage of Scurvy is ſeldom impaired; the patient has been even known to expire with the bite in his mouth.

Such is the Hiſtory of Scurvy, as it generally makes its appearance in his Majeſty's ſhips of war. I ſhall now deſcribe the diſeaſe, as it broke out on board of a ſlave ſhip, attended with many ſingular phenomena never before related; which ſhew in an emphatic manner, under what unfavourable circumſtances the unfortunate Africans are expoſed to the horrors of diſeaſe, and confinement on ſhip-board.

About the beginning of June, 1783, the Guineaman, of which I was ſurgeon, ſailed from the port of Liverpool. After a favourable paſſage of little more than a month, we came to anchor at Cape La How, on the Gold Coaſt; having buried a ſailor who died of the ſmall pox, a dan-

a dangerous diſtemper in a ſlave ſhip; but by taking proper precautions, and throwing every thing over board which belonged to him, the infection only extended to one black man, a paſſenger, who was confined in the long-boat till he recovered. No ſhip had opened trade here ſince the concluſion of the war; ſo that in the ſpace of a week, we had bought more than an hundred prime ſlaves, young, ſtout, and healthy. This was thought a lucky beginning; but when we came to Anamaboe, the trade was ſcarce, and the price of ſlaves very high, from the number of veſſels then lying in the road, which were eight or ten. So ſlow was now our purchaſe, that in February we had not got on board two-thirds of our complement.

About this time it was remarked, that the ſlaves bought at Cape La How, were growing exceedingly fat. On this account it was recommended to the maſter of the ſhip, to allow them more exerciſe, and reduce the quantity of diet,

which had hitherto been too much from a miſtaken notion that it would ſtrengthen them the more, to bear the paſſage to the Weſt Indies. Their food conſiſted of beans, which were brought from England, and rice and Indian corn, which were bought on the coaſt. Theſe articles were boiled to the conſiſtence of a ſoft paſte, and made as near as poſſible like the food of the country by the addition of palm oil, Guinea pepper, and common ſalt. A crew which held from fourteen to ſixteen quarts of this compoſition, was ſerved to ten of them twice a day: they were allowed to drink what water they pleaſed; but, from being confined below, about ſixteen hours out of the twenty-four, and permitted no exerciſe when upon deck; it was eaſy to foreſee that they could not long remain in a healthy ſtate. Such, however, was the obſtinate and conceited ignorance of the maſter of the veſſel, that this treatment was ſtill perſiſted in; the food was continued in the ſame proportion, till you would have thought that ſome of them,

them, with much difficulty walked along the deck. And, though a certain number might have been unfettered without endangering the ſafety of the ſhip, it was not attended to. The cuſtom of dancing them round the deck to the ſound of the drum, was not practiced till it was too late to be of ſervice.

It will be proper to obſerve here, that theſe poor wretches are ſhackled in pairs, by the wriſts and ancles; when they come upon deck, two long chains are paſſed through their irons at the ancle, which reach from the forecaſtle to the barricade, for the purpoſe of confining them to one ſpot. The rooms where they are ſecured below, are from five to ſix feet in height, according to the ſize of the ſhip; but beſides the number that lie on the deck, about one half as many are ſtretched on what they call a platform, that runs along the ſides of the veſſel; raiſed about two feet and a half from the floor, and of

breadth

breadth ſufficient for the length of a man. * Here they are ſtowed *ſpoonways*, according to the technical phraſe; and ſo cloſely locked into one another's arms, that it is difficult to move without treading upon them. The rooms are imperfectly aired by gratings above, and ſmall ſkuttles in the ſide of the ſhip, which, of courſe, can be of little uſe at ſea. The gratings are alſo half covered when it blows hard, to keep out the ſalt ſpray or rain. The temperature in theſe apartments, when they became crowded, was ſometimes above 96° of Farenheit's ſcale. A misfortune befel my thermometer in the latter part of the voyage, ſo that I had not an opportunity of meaſuring the heat when the rooms were as full as they could hold. I, myſelf, could never breathe there, unleſs under the hatchway. In ſuch ſituations it may be ſuppoſed that the

* If I am right informed, a ſection of this ſhip was laid before the Society for the Abolition of the Slave Trade; in order to calculate what ſpace was allowed for each individual to ſleep upon, when ſhe carried 650 ſlaves.

ſufferings

ſufferings of theſe creatures are ſometimes dreadful. Air heated and rarified to ſuch a degree, and loaded with animal effluvia, cannot fail of being noxious to life; there were certainly inſtances where ſome expired from ſuffocation, having ſhown no previous ſigns of indiſpoſition. * During the ſeaſon of the year, that the ſhip was on the coaſt, there was little rain, and the weather was not more ſultry than uſual in theſe latitudes.

In this ſituation, things remained with us, till the beginning of March; no precautions being taken to preſerve the health of the ſlaves; when a corpulent young Negro, complained to me of a hardneſs, in the *ſupinator radii longus* of his right arm. This hardneſs appeared of a very unuſual kind, for it did not retain the ſmalleſt impreſſion of the finger, or of any force which I applied to the ſpot. He was ordered

* Vide Doctor Trotter's Evidence on the Slave Trade, before the Seleft Committee of the Houſe of Commons.

ſome

ſome ſimple liniment to rub it with; but, on examening the part next day, I found the hardneſs extend to all the muſcles on the upper part of the fore-arm, with ſome contraction at the joint of the elbow, and rigidity of the tendinous *aponeuroſis* of the *biceps flexor cubiti*. None of theſe parts, however, were very painful, or the leaſt increaſed in ſize. In this manner it gradually ſpread up the arm, and ſhoulder, over the muſcles of the neck, thoſe of the lower jaw, producing a *triſmus*; from thence to the cheſt and abdomen, till a ſpaſtic rigidity ſeemed to pervade every muſcle of the trunk and extremities.—About the time that the muſcles of the neck became affected, a ſtupor came on; and while he retained the uſe of his left hand, he employed himſelf in picking ſticks or ſtraws from the deck, as people do the bed clothes in a ſtate of delirium. The eye which was bloated, was now fixed, and conſtantly open; the tongue was locked between the teeth and lolled out at the one ſide of the mouth for three days before death.

death. In this caſe the warm bath was tried, and perſiſted in, for ſome time, but without effect: and when endeavouring to force the jaw open, to pour ſome medicine into his mouth, the gums were perceived to be ſpongy, bleeding, and part of them falling from the teeth in black maſſes, many of which were looſe: the fetor of the breath was alſo extremely diſagreeable.*

There now remained little doubt that the diſeaſe in queſtion was Scurvy; though I could by no means reconcile circumſtances to any thing I had either read or ſeen of it elſewhere.

It became, of courſe, a matter of ſerious importance to inveſtigate the cauſes of this ſingular diſtemper, and to counteract them in ſome manner ſo effectually as to ſecure thoſe that

* From all my enquiries among both white and black people, I was not able to learn, that ſuch a diſeaſe as Scurvy, was ever ſeen among the natives of Africa on ſhore; but I verily believe that it has occurred more frequently in ſlave ſhips, than has been ſuſpected.

were healthy. It ſoon ſtruck me that the unwieldy corpulency of the Negro who had juſt died was very probably the cauſe of the complaint. The fatteſt ſlaves were accordingly ſelected, and ſeparated from the reſt; upon examining them attentively, the muſcles on different parts of the body, but particularly of the extremeties were affected in various degrees, with that ſingular kind of induration deſcribed in the preceding caſe. Their gums were all affected; ſome of them bleeding; pieces of ſpongy fleſh were ſeen ſprouting from the roots of the teeth: what black people conſider as the moſt unſeemly diſfiguration, a few had loſt ſeveral of their teeth. Pains and weakneſs of the limbs were general; tightneſs and oppreſſion about the *præcordia*; diſagreeable ſmell of the breath, &c. A particular ſluggiſhneſs and diſlike to motion, or being ſpoke to, were obſerved in a few; and whenever they lay down, they fell inſtantly into a ſleep, from which it was difficult to rouſe them. Wherever there were ſores on any of them,

them, the ſurface was covered with the black cloat of blood, and the thin diſcharge which diſtinguiſh all ſcorbutic ulcers. Inſtead of any hardneſs, however, two or three had œdematous ſwellings in their legs, to a very conſiderable degree, and retaining the mark of the finger for a long time after they were preſt. The ulcers were apt to bleed on the ſlighteſt irritation, if the diſeaſe had made ſome progreſs; and alſo hæmorrhagies from the noſe, and purgings of blood. * But in the advanced ſtate of the diſeaſe, the diſpoſition to ſleep ſeemed to be one of the moſt unfavourable ſymptoms; it was conſtantly changed to a coma and delirium; and none but one with this ſymptom ever recovered. Contractions of the elbow as well as the ham were common; but the colour of their ſkins prevented the livid coloured ſpots from being ſeen diſtinctly, as in white people. Looſe ſtools were

* The blood which flowed from the hæmorrhagies was always of a colour darker than uſual, and when cold, only formed a partial coagulum.

frequent, and with ſevere griping. Theſe complaints are very common in ſlave ſhips; but ought rather to be called diarrhæas than fluxes, which are ſometimes combined with the Scurvy, and ſaid to be more often aſſociated with it than other diſtempers.

The pulſe ſeemed no index to the ſtate of the patient, at leaſt, no general concluſion could be drawn from it. The appetite continued natural to the laſt, and ſome of them expired while eating their victuals round the meſs crew.

This diſeaſe was for ſome time confined to the ſlaves that had been longeſt on board, but particularly to the moſt corpulent, who had taken the leaſt exerciſe: ſo general was this obſervation, and ſo fully was I confirmed of it, that when a Negro was becoming rapidly fat, it was no difficult matter to determine how ſoon he would be ſeized with the Scurvy. Thus it ſpread among them by haſty ſtrides, till it ſhewed,

ſhewed, in different caſes, every ſymptom mentioned by writers on the ſubject.*

When it came to affect more than thoſe of the firſt purchaſe, I could plainly perceive the natives of ſome countries much more liable to it than others. Theſe were the *Duncos*; a people rather of a ſallow complexion than black, a heavy dull look, ſtupid, inactive, and gloomy turn of mind. While the *Fantees*, who inhabit near Cape Coaſt, are preferred to all other natives of Guinea, on account of their genteel ſhape and fine black colour, were ſcarce at all tainted with the diſeaſe. Theſe are a cheerful, active, lively people, and generally the firſt to raiſe mutiny in ſhips, or undertake any hazardous enterprize.

* Not being able to ſpeak the language of the Africans, I did not remark the Nyctalopia, as mentioned by Dr. Blane in Mr. Telford's report. This ſingular ſymptom is however taken notice of by authors before Mr. Telford obſerved it in the Weſt Indies; and is to be found in Dr. Hulme's Inaugural Diſſertation, de Scorbuto, Edin. 1765, which he afterwards publiſhed in Engliſh.

What

What has been juſt now ſaid, ſtrongly confirms the opinion, how much pre diſpoſition, ſuch as depreſſing paſſions of the mind concurs in the production of Scurvy; while thoſe of the active kind, have the happieſt influence in the prevention. The difference remarked between the inhabitants of the two countries, is probably owing to the dry and elevated, or the low and ſwampy diſtricts of land, where they live. Certainly, ſuch ſituations, give very different characters to the conſtitution of both body and mind: but this is degreſſing from our ſubject. The prediſpoſition to Scurvy muſt be alſo increaſed by the hardſhips they experience from their confinement in the hold of a ſhip, which, no doubt, will keep alive many of theſe gloomy reflections inſeparable from a ſtate of captivity. It would be unjuſt to ſuppoſe that the African feels no parting pang when he takes the laſt farewell of his country, his liberty, his friends, and all that is to be valued in exiſtence! This fact is ſupported by ſome caſes of ſuicide, which

came

came under my own obſervation; one of which was conducted with a *ſtoick* enthuſiaſm, and plainly evinced the innate love of freedom of uncivilized beings. In the night they were often heard making very hideous kinds of moaning, ſomething expreſſive of extreme affliction. This, upon inquiry, I found to be owing to dreaming of being at home among their friends and relations, and the melancholy reverſe at waking, on finding themſelves among their captive countrymen in the hold of a ſlave ſhip. Some of the women in theſe ſituations were thrown into violent hyſteric fits.

Few of the boys had any ſcorbutic ſymptoms: none of them were ſhackled, and by being allowed to run about the deck, and occaſionally aſſiſt in the duty of the ſhip, their health ſeemed to be preſerved by the exerciſe. This was alſo the caſe with the women; for out of the whole number only eight were affected, and theſe of the *Dunco* country.

During

During this ſickly ſtate of the ſhip, none of the ſailors were in the leaſt tainted with the Scurvy. Their diet was the common ſea fare; a little of the victuals prepared for the ſlaves, was generally eat, with the ſalt beef: they had it however in their power to barter ſome of their proviſions with the natives for freſh vegetables. The water in uſe was brought from a ſtagnant pool at Cape Coaſt caſtle, ſupplied by rains, muddy, and of a very unpleaſant taſte. It abounded with animalcules, and is ſaid to have the effect of producing the Guinea worm: this ſeemed to be the caſe with the ſlaves purchaſed to windward, who had no ſigns of the complaint till after living a few months in Anamaboe road. Some water was procured for the ſhip at Cape La How, but it was as pure, and kept as well, as water brought from England. The road where the ſhips lay at anchor is open to the ſea; the land wind ſeldom reaches them, at leaſt not ſo as to be unhealthy to the ſeamen, or to produce any of the effects of marſh *effluvia*; and the

the ſea breeze is conſtant and refreſhing. There were a few tornadoes during our ſtay, attended with thunder, lightening, and heavy ſhowers of rain; but they never exceeded half an hour in duration. The thermometer, in the ſhade, at any time, ſcarce roſe above 86°, which was in December, called the *Harmattan* ſeaſon, from ſome very unwholeſome fogs that now and then happen, and are attended with great mortality of the inhabitants.

Our ſituation was now ſo bad that numbers were daily taken ill, and others dropping off; while the maſter of the veſſel, whoſe diſpoſition and character were congenial to the trade, attributed every thing to the machinations of the doctor and devil. About the end of April, 1784, our cargo to near 650 was completed: by this time ſeven or eight had died of Scurvy; from eighty to ninety were already ill, and more likely to add to the number. Our ſtock of freſh vegetables at leaving the Coaſt of Africa, did not

exceed a few gallons of lime-juice, ten or twelve dozen of oranges, and ſome ſmall baſkets of guavas: this was owing to the maſter doubting that the diſeaſe in queſtion was Scurvy, which I ſo confidently aſſerted.

After being four or five days at ſea our liſt of ſcorbutics was nearly doubled; much mortality was alſo to be apprehended from bowel complaints ſpreading among them. I was now a good deal ſurprized to find two ſlaves who had not been above fourteen days on board ſhew evident ſigns of the Scurvy, ſuch as ſpongy gums, pains of the limbs, tightneſs of the breaſt, difficulty of breathing, fetid breath, contracted hams, &c. In a few days after that ten or twelve more of the latter part of the purchaſe were added to the number. Till now the diſeaſe had been aſcribed to over abundant diet, no exerciſe, and the want of freſh vegetables: I was alſo well aſſured that Scurvy had never made its appearance among ſlaves in a Guineaman ſooner

than

than ſome months confinement, ſo that in the preſent caſe, ſome other cauſes ought to be ſuſpected. It is no new opinion, but remarked by ſome of the oldeſt writers, that the Scurvy is a contagious diſeaſe. This opinion was plauſible, from the nature of the diſtemper, and the number of people afflicted at the ſame time. What Doctor Lind has ſaid in oppoſition to theſe arguments is very ſatisfactory. Doctor Blane, in his Obſervations on the Diſeaſes of the Fleet, has revived the ſubject of its contagious diſpoſition; but his concluſions can ſcarce be admitted. Why ſuppoſe that the diſeaſe was communicated from a few men in a ſhip, whoſe conſtitutions were remarkably prediſpoſed, to the reſt, when they were all expoſed to the ſame exciting cauſes, viz. the deficiency of freſh vegetables? We are well aſſured that no prediſpoſition can beget Scurvy without the exciting cauſe. Where ſome are afflicted before others, we ought, certainly, to aſſign it to *idioſyncraſy*, or peculiarity of temperament,

if no external cauſes, ſuch as cold, fatigue, &c. had concurred to produce it; for when the body has been ſubjected to the diet of which Scurvy is the immediate effect, it will make its appearance, though in a longer time, without any prediſpoſition whatever. During the late armaments, ſeveral ſhips, ſhortly after being commiſſioned, received men from Eaſt and Weſt Indiamen bad of the Scurvy; theſe were moſtly cured on board; but none of the ſhips company were ever tainted by them. I am extremely unwilling to admit the contagious nature of this diſeaſe; and if it cannot be propagated that way, it is moſt likely that the tainted atmoſphere of the ſlave rooms, which were now full, ſo powerfully prediſpoſed thoſe late purchaſed Negros to Scurvy, that the exciting cauſe was much accelerated in its operations by the foul air which they breathed; impure exhalations have, therefore, been deſervedly mentioned by authors among the remote cauſes of Scurvy.

The

The ſmall ſtock of antiſcorbutics carried to ſea being ſoon conſumed, the ſtate of the ſlaves was left miſerable indeed. The decks in every corner were crouded with objects of diſtreſs, exhibiting ſcenes of affliction, equal to any ever recorded, of this loathſome diſtemper. Some were found dead in the rooms in a morning, or dropped down immediately on coming upon deck, while others expired eating their victuals, full in fleſh and blood. After a few weeks paſſage, however, to the relief of theſe unfortunate wretches, and to our own inexpreſſible joy, we made Antigua; having buried nearly forty by the way. It is highly probable, that had the ſhip been ten days more at ſea, half the cargo muſt have periſhed, there being, at this time, about three hundred tainted, in different degrees, with Scurvy.

Immediately on making land, the ſlaves were unſhackled; their confinement in irons being no longer required for the ſafety of the crew and

and veſſel. On coming to anchor at St. John's, ſupplies of freſh vegetables were procured from the ſhore, conſiſting of ſhaddocks, lemons, limes, oranges, pineapples, &c.; theſe articles were ſerved to them three or four times a day, and notwithſtanding they continued their uſual diet, from the time we left Antigua, till we came to anchor in Kingſton Harbour, Jamaica, which was eight or nine days, there were little remains of Scurvy among them: they were now better fed, and repaired for market. The coarſe joints and offals of beef were boiled among their proviſions. On the week following the ſale of this *cargo of human beings* opened at what was called a very high price.—Let us now turn our attention to the diſcordant theories of this ſingular diſeaſe.

SECTION

SECTION II.

THE THEORY OF SCURVY.

FROM the Hiſtory of Scurvy given in the preceding pages, it appears, that it is found in very different ſituations; that the diet which it follows, is ſometimes of ſalted meats; at other times no ſalt proviſions were in uſe, but food altogether vegetable in its nature: there is one circumſtance, however, to be remarked, that when it has affected a number of perſons living on vegetable diet, at the ſame time there has always been a deficiency of *freſh* vegetable matter. Such were the caſes deſcribed in the laſt Section. Throughout the whole ſymptoms of this diſeaſe, there is ſomething ſo peculiar to itſelf, that no deſcription, however accurate it may be, can convey to the

the reader a proper idea of its nature. It is thus, that phyſicians drawing general concluſions from the writings of authors, have been led to form theories very different from the real genius of the diſtemper, and the truth of which aſſertion we hope to render evident in the following pages.

It would be foreign from the purpoſe of our undertaking to trace the opinions of ancient writers, in attempting to eſtabliſh the proximate cauſes of diſeaſes on the Pathology of the fluids. Their theories have occaſionally varied from the ſuppoſed elementary principles of natural bodies, to the different oils, ſalts, and ſulphur, introduced by chemical philoſophy into medicine; and which have had their ſhare in the faſhionable doctrines of the times that gave them birth.

In the Syſtem of Boerhaave, a doctrine of proximate cauſes is chiefly ſupported from the chemical changes of the blood, ſuch as acid, alkaline,

kaline, &c. according to the nature of the remote cauſes. In our own times, Doctor Cullen, whoſe Syſtem has ſuperſeded that of Boerhaave, contends for a præternatural ſaline ſtate of the fluids in Scurvy; this he ſuppoſes to be of the ammoniacal kind, evolved during the animal proceſs in greater quantity than uſual, from the abundance of marine ſalt taken into the body; and the proviſions themſelves, perhaps, in a putrid as well as a ſalted ſtate.

From the moſt ancient writers, till within theſe few years, the Scurvy has been claſſed among putrid diſeaſes. The very nature of its production, the fetor of the breath, cadaverous ſmell of the ulcers, and bloated appearance of the whole body, ſeem to have acquired it this appellation. This putreſcency was ſaid to exiſt in the blood, and nothing could be more natural than the concluſion. The Scurvy has conſtantly followed a peculiar kind of diet; of ſalted meat, ſometimes badly

preſerved; of corn, damaged, and mouldy; and with theſe very often impure water, and no freſh eſculent vegetables. This concluſion concerning the ſtate of the body was likewiſe very much ſtrengthened by the longings and deſires of the patient for recent vegetables, which were alſo found ſo effectual in curing the diſeaſe. It was, therefore, a very ſimple inference, that the fluids ſupplied by theſe kinds of *ingeſta* could not fail to partake of their nature.

The word *putrid*, as commonly applied in chemical language, is, certainly, improper: the original meaning is to expreſs any diſagreeable ſmell, but particularly that pungent volatile vapour ariſing from corrupted, or corrupting, animal or vegetable matter. This offenſive effluvium from decaying vegetables is found to be nothing elſe but inflamable air, or the *hydrogenous gas* of the modern chemiſts. In the putrefaction of animal bodies, and the cruciform plants, however, the vapour is found to

to be *ammonia*, or alk. vol. and compoſed of a ſubſtance peculiar to animal matter, and the hydrogene. It is, therefore, a *deficit* in chemical language, and is to be regretted, that thoſe chemiſts, whoſe labours have enriched ſcience by ſo many beautiful diſcoveries, ſhould not have added to the new nomenclature a term more expreſſive of that ultimate decompoſition of bodies, than what we mean, at preſent, by the putrefactive fermentation.

To apply this doctrine to the human blood, to account for the proximate cauſe of Scurvy, is attended with inſuperable difficulties. The blood in ſcorbutics has no particular ſmell, but is manifeſtly of a darker colour; it coagulates; it does not grow ſooner putrid than other blood in the ſame temperature of heat. Are theſe compatible with a præternatural quantity of ammonical ſalt in the circulating maſs? Could any chemical proceſs be ſo accurately conducted, as to diſcover whether this ſalt predominates more in this diſeaſe than in

health? The ſerum of the blood is certainly more acrid than natural, for the marine ſalt that has been recovered from the urine, muſt have mixed with the general mass before it was ſeperated by the kidnies.

At a time when the doctrine now mentioned was in full vogue, not implicitly received, but thought to be confirmed by the experiments of Sir John Pringle; the theory of *fixed air* was extended to its ſupport by Doctor M'Bride. Following, Doctor Hales, and the diſcoveries of Doctor Black, the preſent illuſtrious profeſſor of chemiſtry in Edinburgh; he conſidered fixed air as the principle, forming the cement, or bond of union, on which the firmneſs, ſoundneſs, and perfect coheſion of bodies chiefly depends. He, therefore, contended that the putrid tendency of the blood in Scurvy, was owing to the loſs of that principle; and by reſtoring it, we cure the diſeaſe.

A method

A method of cure founded on Doctor M'Bride's experiments, and recommended by him, has actually been practiſed in the navy ſince that period. The reports of navy ſurgeons, however, who have made trial of the malt infuſion and eſſence of wort, are very diſcordant. In a future part of this Work, I ſhall ſhew on what erroneous principles both Doctor M'Bride's theory and method of cure were eſtabliſhed.

Amidſt a multitude of caſes coming daily under obſervation, Doctor Lind did not fail to inquire after the ſtate of the blood in this diſeaſe. From various remarks and experiments, he concluded that the vital fluid had ſuffered no change, but remained in a healthy ſtate. This, no doubt, prompted him to inquire ſtill farther into the nature of the diſtemper; and the indigeſtibleneſs of the diet inducing a debility of the ſtomach was aſſigned as the cauſe of Scurvy, inſtead of the putreſcency occaſioned

occaſioned by the ſalted meats, ſo often, and confidently aſſerted by preceding writers on the ſubject.

"I am fully confirmed, ſays he, in my "opinion, that whatever weakens the *conſti-* "*tution*, and eſpecially the *organs of digeſtion*, "may ſerve without *any* other cauſe to intro- "duce this diſeaſe, in a ſlighter or higher de- "gree, even among ſuch as live on *freſh vegeta-* "*bles, greens, or the moſt wholeſome diet, and* "*in the pureſt air.*" * This paragraph taken from the work of a phyſician, who had ſeen more of the Scurvy than perhaps any other, is one of the moſt unaccountable that has ever crept into the records of medicine; and carries with it ſuch an air of authoritative confidence, that it would ſeem the higheſt preſumption in me to attempt its refutation, was I not convinced that it conveys notions of the com-

* Lind's Poſtſcript.

plaint

plaint very foreign from its real nature. It may, however, be conſidered as the text of Doctor Milman's opinions, who, following up this idea of the Practical Phyſician, has founded a theory on debility, and aſſerts, "that the "Scurvy is not a diſeaſe of the fluids, but of "the ſolids; that its ſeat is in the muſcular "fibre; that its proximate cauſe conſiſts in "the gradual diminution of the vital power, by "the remote cauſes of the diſeaſe." *

To theſe Authors may be added Doctor Blane, late phyſician to the fleet in the Weſt Indies, who in his Obſervations on the Diſeaſes of Seamen, ſays, "It has long appeared to me, "that the Scurvy is owing rather to a defect "of nouriſhment, than to a vitiated ſtate of "it." †

* Milman's Enquiry into the ſcource from whence the ſymptoms of Scurvy and Putrid Fevers ariſe.

† Page 509.

The

The opinions of theſe Phyſicians concerning Scurvy are the ſame, viz. that the remote cauſes of the diſeaſe, ſuch as the ſea diet, act, by not ſupplying the body with nouriſhment ſufficient for the purpoſes of a healthy ſtate, and, therefore, the body is reduced to that degree of debility, from whence the ſymptoms of Scurvy ariſe.

Before attempting to invalidate their arguments in favour of the *direct debility* induced by the remote cauſes of Scurvy, let us try the application of their experiments concerning the quality of ſea diet, as being ſalted. Dr. Lind tells us of ſalt water being ſometimes drank in great quantities with impunity, and even ſcorbutic ſailors uſing it without any bad effect. All this may be very true. Salt taken in this manner, is powerfully diluted with a large proportion of water; to this aqueous fluidity, is owing in a great meaſure its purgative qualities.

ties. Thus, partly from its bulk, and partly from its acrid nature, it is quickly paſſed through the inteſtinal canal; by which means, either ſo ſmall quantity is taken up by the abſorbents, or what may enter the circulation, will be ſo much diluted with the water taken with it, that though the ſalt may not be capable of aſſimilation with the animal fluids, this water will ſtill be the means of its being carried the eaſier and ſooner off by the various excretions. Thus it may be taken with impunity as we daily ſee; but can we apply the like reaſoning to the manner in which it is taken with ſalt beef or pork. In all accounts of the diſeaſe from thoſe who have been converſant with it in our ſhips of war, till the ſmall beer was done, and the water ſerved in allowance, the Scurvy has been ſeldom known. After eating ſalted proviſions of every kind, or even ſalt itſelf, the thirſt which is thereby excited, is a ſtrong effort in nature to relieve the body from the noxious power, which is beſt done by large draughts of water. Plentiful

dilution muſt, therefore, be of much conſequence for the prevention of Scurvy; and there can be no doubt but the ſalt muſt alſo be hurtful, by loading the blood with ſomething foreign to its nature, if it is retained for any length of time in the body.

The experiments of Sir John Pringle and others concerning the antiſceptic properties of ſea ſalt, appear to me unworthy to be mentioned, in explaining any proceſs within the body; and I ſhall reject them altogether.

I believe it is ſtill a queſtion in diſpute, whether ſea ſalt undergoes any change in the animal body; but it would not be an eaſy matter o aſcertain it by trial. Some experiments of my own convince me, that ſalted proviſions, ſuch as are generally uſed in King's ſhips, beef, for nſtance, ſeems to have undergone ſome very material changes from the ſalt, before it is taken nto the body. This does not depend upon the beef

beef approaching nearer to a ſtate of putrefaction; for great care is taken that no damaged proviſions ſhall be ſerved to ſeamen; but there is a chemical attraction between the beef and ſea ſalt. Indeed ſomething of this kind muſt have been expected to take place, otherwiſe it could not be preſerved: this is, what in common language, is called *taking on the ſalt*; for if it happens to be too long kept, the elective attraction between them is deſtroyed, and the meat putrifies. My ſituation at preſent, however, does not enable me to proſecute my inquiry in the manner I could wiſh; but ſhould any chemiſt undertake the experiment, I beg leave to recommend him to uſe that kind of beef which has been kept above two years. It is curious to obſerve the effects of ſalt on meat preſerved for this length of time; in ſome pieces which I have examined, the whole bone, in particular, ſeemed to have undergone alterations, and little more was left than the mere earth; from which circumſtance, the fleſhy parts alſo, muſt be con-

ſiderably changed in their nature. The cylindrical bones are not ſo ſoon affected with the ſalt as thoſe of a ſofter texture, ſuch as the breaſt bones and ribs. But theſe facts render it highly probable, that a double elective attraction takes place here, and, conſequently, a change in both ſubſtances. If this is the caſe, it is likely there was ſome miſtake in Doctor Lind's recovering the marine ſalt pure from the urine of ſcorbutics. He did not make any compariſon between the quantity taken in and that recovered; the fluids, no doubt, might already be loaded with ſo much ſalt, as to aſſimilate no more, and, therefore, it might paſs off unchanged by the kidnies. Doctor Cullen's opinion perfectly agrees with that delivered above. He ſays, "even ſuppoſing ſuch ſalt to ſuffer no change in "the animal body, the effects of it may be con- "ſiderable." * This muſt be readlly allowed,

* Firſt Lines. Vol. IV.

though

though we ſhould not be able to account for its operation.

But to prove, beyond all doubt, that theſe proviſions are hurtful from being ſalted, I ſhall produce Doctor Lind's own words, which plainly ſhow that concluſions he has elſewhere drawn are by no means to be truſted, in this part of the controverſy. Nothing, but the ſake of truth, could make me thus impeach the accuracy of the learned Author.

" There are not wanting, ſays he, inſtances " of the good effect attending the method of " putting the ſhip's company in long voyages " upon a very ſhort allowance of ſalted meats. " The following is too much to the purpoſe to be " omitted, as it ſeems to demonſtrate the utility " of the meaſure, by a comparative trial, at dif- " ferent times of its effects.

" In

" In a former war, the men beloning to the " Sheerneſs, bound to the Eaſt Indies, appre- " henſive of ſickneſs in ſo long a voyage, " petitioned their captain not to oblige them " to take up their ſalt proviſions, but rather to " permit them to live on the other parts of their " allowance. Captain Palliſer ordered that they " ſhould be ſerved ſalted meat only once a week, " viz. beef one week, and pork the other. The " conſequence was, that after a paſſage of five " months and a day, the Sheerneſs arrived at the " Cape of Good Hope, without having ſo much " as one man ſick on board. As the uſe of Sut- " ton's pipes had been then newly introduced " to King's ſhips; the captain was willing to " aſcribe part of ſuch an unuſual and remark- " able healthfulneſs, in ſo long a run, to their " beneficial effects; but it was ſoon diſcovered, " by the neglect of the carpenter, the cock of the " pipes had been kept all this while ſhut. This " ſhip remained in India ſome months, where " none

" none of the men, excepting the boats crews,
" had the liberty of going on ſhore; notwith-
" ſtanding which, the crew continued to enjoy
" the moſt perfect ſtate of health. They were,
" indeed, well ſupplied with freſh meat.

" On leaving that country, knowing they were
" to ſtop at the Cape of Good Hope; and truſting
" to a quick paſſage, and to the abundance of
" refreſhments to be met there, they ate their
" full allowance of ſalted meats, during a paſſage
" of only ten weeks; and it is to be remarked
" that the air pipes were now open. The effect
" of this was, that when they arrived at the
" Cape, twenty of them were afflicted in the
" moſt miſerable manner, with ſcorbutic and
" other diſorders. Theſe, however, were ſpeedily
" recovered on ſhore by the land refreſhments.
" Being now thoroughly ſenſible of the bene-
" ficial effects of eating in theſe ſouthern lati-
" tudes as little ſalt meat as poſſible; when at

" ſea,

"ſea, they unanimouſly agreed in their voyage "home from the Cape, to refrain from their "too plentiful uſe of ſalted fleſh. And thus, "the Sheerneſs arrived at Spithead with her "full compliment of 160 in perfect health, and "with unbroken conſtitutions; having, in this "voyage, of fourteen months and fifteen days, "buried but one man, who died in a faliva-"tion." *

This paragraph proves as plain as facts can do, that as a diet approaches more to a vegetable nature, and of that eſpecially to the recent ſtate the Scurvy, will be the more diſtant. In no part of the Doctor's Work has he been able to invalidate this quotation. It at once alſo does away whatever he has advanced againſt the farinaceous part of a ſeaman's diet; for had it been as hard of digeſtion as he is willing to make us believe, it could not have prevented the Scurvy as it manifeſtly did; but the diſeaſe muſt have

* Lind's Eſſay on the Health of Seamen.

appeared

appeared, equally from its uſe, as from the ſalted proviſions, if either can produce it, by debilitating the digeſtive organs, or depriving the body of nouriſhment.

His experiments upon the blood in Scurvy are ſometimes frivolous. Theſe experiments were made at Haſlar Hoſpital, at what ſtage of the Scurvy we are not informed; nor has he told us how long they had been under medicine and diet on ſhore. The very ſudden recoveries in ſome caſes of this complaint, after the uſe of freſh vegetables, would make us believe that a day or two muſt materially alter the ſtate of the human fluids. But if it was true, as has been elſewhere aſſerted, that the blood in ſuch ſituation is *præternaturally ſaline*, patients who had lived but a ſhort time on the hoſpital broths, which are full of eſculent vegetables, if they had no others, muſt have had the ſerious part of the circulating maſs ſo changed or diluted, as to paſs off rapidly by the various excretories, otherwiſe

naturally diſpoſed to be carried off by theſe emunctories.

What he has, therefore, ſaid on the taſte of the ſerum, on which Doctor Milman lays ſo much ſtreſs, I am diſpoſed to treat as a miſtake. He tells us that the ſerum of the blood drawn from perſons in health, affects the organs both of ſmell and taſte with ſenſations not eaſily to be deſcribed; whereas the blood taken from perſons in the Scurvy, gives the leaſt perceptible ſenſations by taſting or ſmelling, of any blood he had examined. The alluſion he made uſe of on this occaſion was, certainly, unworthy of his ſubject. Although it is a proverb as old as the days of Solomon, that there is no taſte in the white of an egg, yet we know that it is not matter of fact; for the *albumen ovi*, is not an inſipid ſubſtance; but yields, upon analyſis, all theſe principles to be obtained by a ſimilar proceſs from animal matter. It might be aſked, if the ſerum of the blood

was

was inſipid in Scurvy, how came it to be different from the taſte of a healthy ſtate? But the moſt eſſential character of the ſerum is ſapidity. It conſiſts of water, in which a large proportion of ſaline matter is conſtantly diſſolved; it is the vehicle by which nature expells from the circulating maſs, thoſe ſalts which are continually elaborated and evolved by the animal proceſs. It is a well known fact that the urine of ſcorbutics is uncommonly high coloured, and to the taſte more acrid than uſual; this, no doubt, may depend very much on the preceding quantity of watery aliment taken into the body. I have mentioned theſe circumſtances, merely to ſhew, that Doctor Lind's experiments were neither accurate nor deciſive; and, therefore, we are not to adhere to his concluſions till better ſupported. But, as it is not the intention of the preſent inquiry to contend for the putrefaction of the blood in Scurvy, I ſhall quit the diſcuſſion of its real ſtate for the preſent.

Let us now ſee on what grounds they contend for the production of Scurvy, from the exciting cauſes inducing a ſtate of debility, by a diet hard of digeſtion, and not ſufficiently nouriſhing. To ſupport this opinion, the other parts of a ſeaman's fare, conſiſting principally of unfermented farinacea, are alſo ſaid to contribute their ſhare, from an indigeſtible nature. This, certainly, is a part of diet not ſo eaſy of ſolution in the ſtomach as might be wiſhed, ſuch as biſcuits, flour pudding without eggs or milk, and the boiled peaſe. But the quotation from Doctor Lind concerning the health of the Sheerneſs crew, when confined to live on this ſpecies of ſea diet, abundantly proves that the unfermented farinacea, inſtead of aſſiſting the other cauſes, will, occaſionally, not only retard the appearance of Scurvy, but contribute very much to prevent it. It would be digreſſing from our main ſubject, to defend the farinacea as hard of digeſtion. The lower claſs of people in moſt countries, live almoſt entirely on theſe ſubſtances; they are the healthieſt part of mankind,

kind, and among them, complaints of the ſtomach are very rarely found. Upon the whole, the indigeſtibleneſs of this kind of food has ariſen more from a predilection to favourite theories, than any reality of their hurtful tendency; particularly from preconceiving that fermentation is the principle agent in digeſtion. But where are the ſymptoms after their uſe, that ſhow a depraved digeſtion; ſuch as ſickneſs at ſtomach, want of appetite, and its conſequences emaciation of the body from not being duly nouriſhed? "Doctor Lind aſſures us, that he has "known meſſes, as they are called, of ſeamen, "who have lived during a voyage of three "years on the ſhip's proviſions for want of mo-"ney to purchaſe better fare; eſpecially greens, "and yet have preſerved their health." * Admitting, even their own ideas of the diſeaſe, what are we to learn from this fact? Here is a ſhip's company living for three years on a diet ſo

* Vid. Milman, p. 53.

hard

hard of digeſtion, and ſupplying the body with ſo ſmall a ſhare of nouriſhment, as to produce a diſeaſe, at other times, to uſe their own expreſſion, the very eſſence of which is weakneſs; and that, too, often, in the ſpace of a few weeks, by a a gradual diminution the of vital power. On theſe grounds it would be natural to ſuppoſe, that the effects would be in proportion to the length of time the cauſes were acting; but that was not the caſe, they preſerved their health, after living upon it for three years. It is to be regretted Doctor Lind did not more minutely relate the circumſtances of the ſtation and ſervices of this ſhip; the inſtance of ſuch ſingular good health, is a ſolitary fact in the records of naval operations. But I do not think that ſalted meat itſelf, as iſſued in his Majeſty's Navy, is that indigeſtible diet it has been deſcribed to be. It is, certainly, cured in the beſt manner poſſible; and if it is properly corrected by a due proportion of freſh vegetables, will never be productive of diſeaſe.

But

But that debility of the digeſtive powers, ſo ſtrongly contended for by Lind and Milman, is not an eſſential attendant of the diſeaſe in queſtion. The curious fact from Van Sweten is altogether triffling, "to ſhew how any indi-"geſtible matter, ſuch as old acrid cheeſe, irrita-"tating and weakening the ſtomach, may be apt "to excite the complaint." Equally triffling it was to ſay, that a clove of garlick, taken in a morning, would prevent the Scurvy. * Lind, himſelf, in many parts of his book, mentions the ſoundneſs of the digeſtive organs; in one part, after deſcribing ſome of its worſt ſymptoms; he ſays, "moſt, although not all of them, "even in this ſtage, have a good appetite." Ecthius, one of the oldeſt writers on Scurvy, has theſe words, "the appetite is ſeldom bad; "on the contrary, they have generally a good "one." John Woodfall, the old navy ſurgeon, mentioned by Doctor M'Bride, many of whoſe

* Milman.

obſervations

obſervations would do credit to the moſt refined period of medical reaſoning, uſes the following ſtrong language in ſupport of what I am now attempting to prove: "The ſignes of Scurvy, "ſays he, are many, as namely, a general lazi- "neſs, and evil diſpoſition of all the faculties "and parts of the bodie, ſaving the *ſtomach* and "*appetite*, which is often times greater than or- "dinarie, with them for a long time." The writer of Lord Anſon's Voyage, who witneſſed ſo much mortality from this diſeaſe, in the celebrated voyage round the world, expreſſes himſelf to the ſame purpoſe. I ſhall not, therefore, multiply quotations on the ſubject, for it cannot be ſuppoſed that the ſtomach would deſire food which had already been the cauſe of diſeaſe.

It ſeems very ſurpriſing that none of thoſe authors who have built their theory on debility, ſhould have told us that an emaciated ſtate of body, was one of its ſymptoms. They, certainly,

tainly, did not find it any how connected with with the diſeaſe, otherwiſe it muſt have been mentioned; and we would readily conclude emaciation of body to be a conſtant attendant from the following paragraph of Doctor Blane. "Unleſs, ſays he, the powers of digeſtion and "aſſimilation are remarkably ſtrong, ſalt beef "and biſcuit which have been long kept, do not "contain much more nouriſhment, than ſaw-"duſt or the bark of a tree; and the diſeaſe in-"duced by this diet is Scurvy." * What a contradiction is this to the *three years health* of Doctor Lind, which followed the ſame kind of proviſions? Salted meat, iſſued in King's ſhips, is often from three to five years old; when prepared, as it is done at preſent, it may, certainly, be preſerved ſound for a greater length of time. There are many facts on record to ſhew that it does not loſe ſo much of that nouriſhing principle as might be imagined. From my own experience in eating this kind of food, I can affirm,

* Blane, p. 513.

that with occaſionally a few plantains or yams, and now and then a little fruit; which it cannot be ſuppoſed would add much to the nouriſhment, I have lived in as perfect health for twelve months as ever I enjoyed in my life; and was, if I right remember, more corpulent than when I left England. The ſame remark has been confirmed by what I have ſeen in every perſon I have ſailed with, and I never obſerved, in any degree, emaciation of the body as a ſymptom of Scurvy, unleſs preceding diſeaſe inducing a waſting of fleſh can be called ſuch. It has been my buſineſs lately to make many inquiries for this information among my medical acquaintance in the navy; and not one of them has conſidered the waſting of the fleſhy parts, or an abſorbtion of the fat, as ſymptoms congenial to Scurvy. On the contrary, in a corpulent ſtate of body, the moſt hideous features of the diſeaſe are expreſſed; ſuch are the bloated looks and countenance, ſwelling of the legs, oppreſſion about the breaſt, depreſſion of

ſpirits,

ſpirits, &c. The Scurvy ſeems to riot in ſuch conſtitutions with peculiar virulence, and makes quicker ſtrides to a fatal termination. The ſudden deaths in this diſtemper which I have ſeen, have been in ſimilar caſes, where a more favourable prognoſis might have been formed. Among the Negroes I found no ſigns of indigeſtion or want of nouriſhment; but, in oppoſition to theſe, the diet was highly nutritious, and the inveteracy and aggravation of the ſymptoms ſeemed to be in proportion to the corpulency. Here, notwithſtanding, many of the prediſpoſing cauſes had their full force, ſuch as the want of exerciſe, and confinement in impure air; yet the powers of digeſtion and aſſimilation remained perfectly healthy. I will readily allow that obeſity is often met with in a ſtate of general debility, and even when the organs of digeſtion are very conſiderably weakened: but no man, accuſtomed to inveſtigate ſubjects of Pathology, has yet ventured to aſſert, that obeſity can exiſt, where the

diet is indigeſtible, and contains no more nouriſhment than *ſawduſt* or the *bark of a tree.*

In a ſhip where I ſailed, there was a meſs of midſhipmen who ſeldom gave themſelves any concern of providing a ſea ſtock, ſuch as tea and ſugar, &c. but lived altogether on the ſhip's fare. The only inſtance, where I ever knew a midſhidman afflicted with Scurvy, was in this meſs; he was a young man remarkably corpulent, and the moſt active for his ſize I have ſeen. The ſymptoms were ſpongy gums, and odematous ſwellings of his legs, which were cured by refreſhments in port a few days after the complaint made its appearance, the ſhip having returned to Spithead.

Although preceding diſeaſe ſeems to predispoſe the body to Scurvy; yet this is not always the caſe, and Doctor Lind gives us a ſtrong fact to ſupport it. " Perſons very much emaciated " either with the flux or conſumption, are ſel-

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"dom or never ſeized with the Scurvy." Poſtſcript, p. 508.

But to conclude my argument on this head, that the functions of the ſtomach are entire, is to be proved from principles eſtabliſhed in Pathology. It is well known how long ſcorbutic patients can indulge the uſe of acid fruits, without any ſymptoms of indigeſtion whatever. There is, perhaps, no diſeaſe incident to the human body, where vegetables of this claſs can be ſo freely uſed, without tending, manifely, to debilitate the tone of the ſtomach. A ſmall quantity of lemon juice, and even too ſour punch, have been known to bring on a fit of the atonic gout; perſons ſubject to diſpepſia are ſure to have their complaints aggravated by vegetable acids. It is the ſame in hyſteria and hypochondriaſis, and in every other diſeaſe where the digeſtive organs are ſo immediately concerned. In theſe caſes a degree of fermentation, the certain ſign of a weak ſtomach, and an imperfect digeſtion

digeſtion always takes place; hence, cardialgia, gaſtrodynia, flatulency, and ructations, &c. follow. Whereas we find no ſuch effects to be the conſequence of their uſe in Scurvy; though the quantity of limes and lemons taken ſometimes has been almoſt incredible.

Upon the whole then, I muſt obſerve, that a ſea diet is not productive of Scurvy from being hard of digeſtion, or not affording ſufficient nouriſhment; and that in this diſeaſe, there are, really, no ſymptoms of a weak ſtomach preſent.

But, let us inquire a little farther into the ſuppoſed effects of this depraved digeſtion and nouriſhment, which are ſaid to produce that gradual diminution of the vital power, from whence the ſymptoms of Scurvy ariſe.

It ought to be premiſed here, that I have no intention of offering any arguments againſt the debility

debility preſent in Scurvy; on the contrary, the relaxed tone, and diminiſhed coheſion of the muſcular fibre ſhall be admitted in their fulleſt extent. But I am well aware that their is a ſtate of the body to be corrected, independant of that debility in the primary moving powers; and which indications of cure, cannot be accompliſhed by thoſe means that are found the moſt effectual to reſtore the tone and tenſion of muſcular fibres.

The cauſes which prediſpoſe the human body to Scurvy, are, I readily allow, of a debilitated nature; viz. exceſſive cold, fatigue, low ſpirits, &c. and their action on the ſyſtem are elegantly detailed by Doctor Milman. But all that can be ſaid of their effects is, that they only accelerate the approach of Scurvy, and render the body more ſuſceptible of thoſe cauſes which excite it. The whole of them combined are unequal to produce the complaint, a ſome-

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thing is ſtill wanting; and it is, perhaps, of little importance, whether we conſider that as a diet of ſalted meat, or a deficiency of recent vegetable matter. We ſhall be afterwards inclined to lean to the latter.

But ſo much has been ſaid by different authors concerning theſe prediſpoſing cauſes, that we would be apt to believe the Scurvy is never known without their concuring to produce it. Cold, whether from ſeaſon or climate, we are aſſured, is not neceſſary to excite the diſeaſe; it is found equally virulent in its ſymptoms between the tropics as in Greenland. We meet with it in ſhips during the mildeſt dry weather; humidity is not, therefore, abſolutely required. I can aver that I have witneſſed its appearance in numerous caſes where no prediſpoſition of the body could be ſuſpected, and where foremaſt men of all deſcriptions were ſufferers. I have ſeen what is called a *hardy ſeaman*, who had

treated

treated the raw ſcorbutic landman under his affliction with the moſt ſovereign contempt, forced, a few days afterwards, to confeſs the attack of the Scurvy, when he found it was neither in the power of reſolution or exerciſe to overcome the complaint. Lord Rodney's fleet, in the paſſage from Jamaica to New York, in 1782, affords a ſtriking proof that the Scurvy will appear in ſhips when climate and weather are both favourable to health. Doctor Blane ſays, the whole fleet was more or leſs afflicted with it, though they had only been ſeven weeks and three days at ſea. If there was any prediſpoſition in theſe caſes, it is not mentioned by the learned author; he only ſays, that they had few refreſhments in port before they ſailed, ſo that the ſea diet had been the ſole cauſe. * It is, therefore, of great importance to guard againſt ſuch concluſions; partial obſervations might have a dangerous tendency in regard to

* Blane, p. 146.

the prevention, as making us unmindful of adminiſtering thoſe ſalutary correctors of a ſea diet, which we may otherwiſe employ.

The debility of Scurvy is of ſo ſingular a nature, that nothing ſeems analogous to it: certain it is, that no diſeaſe is related to it, by any concourſe of ſymptoms or method of cure. Thoſe medicines which invigorate the ſyſtem in other caſes of debility, have little or no effect here. Wine, the ſovereign remedy of typhous fevers, gives a momentary ſtimulus, but no permanent relief. It does not retard the diſeaſe; and it is not, even when the mind is ſinking under deſpondency, deſired by the ſcorbutic patient. But wine is not only unable to cure the diſeaſe, but is found of very little ſervice in the prevention. In three inſtances where we have ſeen it general in a ſhip's company, every man had his pint of wine a day, which is the allowance when the beer is done; there are few ſurgeons that have

have had any ſhare of experience in the treatment of this diſtemper, but muſt have made the ſame remark. The celebrated Peruvian Bark, given to the utmoſt extent, has never been known to check the progreſs, or cure the Scurvy; its well known powers in recovering the weakened tone of the ſtomach promiſed much, had the digeſtive organs been ſo much deranged as has been aſſerted. As a general tonic, we might have alſo hoped to find it cure general debility; but there is not now a navy ſurgeon that ever thinks of employing it. The ſcorbutic ulcer, after the uſe of bark for a length of time, and in great quantities, has not put on a more healthy appearance; the thin diſcharge is equally abundant, and the cloat of blood on the ſurface is regenerated as before. But, the moſt powerful ſtimulant applications do not alter the condition of theſe ſores; whereas, in the ſpace of twenty-four hours, after the uſe of limes or lemons, they have put on a florid and healthy appearance; but it is well known in practice

how rapidly ſome large ſcorbutic ulcers will heal when the patient comes to be well ſupplied with the acid fruits and freſh vegetables. This defect of the wine and bark juſt mentioned, may be extended to the whole claſs of tonic and ſtimulant medicines, ſuch as preparations of ſteel, &c. In the cure of this diſeaſe on board of a ſhip, we alſo find that a diet of freſh meat is not abſolutely neceſſary; but that it may be effectually cured while in the ſame ſituation, by allowing freſh vegetables, and particularly the acid fruits to the ſeamen.

About the end of May, 1780, the Berwick, of 74 guns, ſailed for the Weſt Indies, with the ſquadron under the command of the brave and unfortunate Commodore Walſingham, who periſhed in the Thunderer, in the memorable hurricane off Bermuda, the October following. On the third week from our leaving England, ſome of our men complained of a ſtiffneſs of the knee, ſwelled gums, and other ſymptoms of Scurvy.

Scurvy. The beer had been now done a week, and the water was ſerved to the ſhip's company, a certain allowance per man a day. When we arrived at Jamaica, though we got ſome refreſhments to windward, thirty-five of the crew were tainted with Scurvy, ſome of them in its worſt ſtages. The paſſage from the Lizard was not more than eight weeks, and the weather ſo remarkably fine, that ſcarce a ſhower of rain fell while we were at ſea. The hoſpital at Port Royal was at this time full, and could receive no more ſick; the only alternative was, therefore, to cure them on board. This was performed by the limes, oranges, &c. the greater part of which were got in exchange for their ſalted proviſions; which exchange I ſuperintended, in order to prevent them from taking any new rum from the black women who occaſionally brought the fruits to the ſhip. No change was made in the other parts of their diet; for during the four weeks we lay at Port Royal, only one meal of freſh beef was ſerved to the ſhip's company.

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The happy conſequence of this treatment wa, that in ten days they all returned to their duty upon deck.

In the October before this ſhip went abroad, when the grand fleet put into Torbay, nine of the Berwick's people were tainted with Scurvy; many others at the ſame time in different ſhips of the fleet were affected in a ſimilar manner. This had been a plentiful ſeaſon in the cyder countries, and the apples were ſo cheap, that the ſeamen procured them in great abundance for a trifle. Our people ate ſuch quantities, that bowel complaints became very frequent among them; ſo much ſo, that orders were given for no more fruit to be admitted on board. The ſcorbutics, however, in the mean time, had ſhared ſo plentifully of the apples, that in a few days they were perfectly recovered.

During the Baltic armament, ſometime in the month of Auguſt, Daniel Carr, aged about thirty-eight,

eight, a ſtout man, on board the Royal William, then lying in Portſmouth Harbour, was attacked with the Scurvy. He had conceived a great deſire of going on ſhore to the hoſpital, and concealed his complaints till they got to an inveterate degree. At this time, from the difficulty the contractors found in procuring bullocks ſufficient for the conſumption of ſo large a fleet as then lay at Spithead, freſh beef was ſerved to the ſeamen only twice a week. This man expreſſed to me very emphatically his deſire for freſh vegetables. The pains on different parts of his body tormented him more, than moſt ſcorbutics I have ſeen. As ſoon as he grew warm in bed they were unſupportable, particularly in his ſhin bones, and ſeemed in every reſpect to reſemble the ſyphilitic pains of theſe bones. Opiates had the effect of putting him aſleep; but the pains were aggravated by them, and felt more ſevere when he awaked. His knee was contracted, the flexor tendons hard and rigid; large blotches,

livid

livid and black covered the under part of the thigh; effuſions of blood alſo appeared in a livid circle round the eye. Inſtead, however, of ſending him to the hoſpital, he was kept on board. The only remedy made uſe of, was ſix or eight pears and apples twice a day, with two glaſſes of wine after dinner: both the fruit and wine were diſperſed to him from my own hands. By theſe means, on the ninth day from the time he complained, every ſymptom of Scurvy diſappeared, though he ſeemed to be very ſenſibly diſappointed by not being ſent on ſhore to be cured. Several ſhips lying at Spithead had ſent men to Haſlar hoſpital, all of whom had contracted the complaint in port, from the circumſtance of ſupplying the fleet with ſo ſmall a proportion of freſh beef. Theſe are a few of the many inſtances where Scurvy has been cured, without any material change of diet; where no reſtorative food, or ſtimulating medicines were adminiſtered, and though in a ſhip the cure was not leſs ſudden and

complete

complete than when the patient had conveniences of quarters on land.

We have already mentioned the debilitating effects of the acid fruits in the ſtomach; but they extend to the whole alimentary canal, and the ſyſtem in general. Their conſtant attendant is a very lax or purging ſtate of the bowels; the body becomes evidently weaker, and loſes its plumpneſs during their uſe; this is ſometimes carried to a great degree of emaciation. Among the Negroes it was remarkable; yet the cure of Scurvy went on progreſſively; its more particular ſymptoms ſoon diſappeared; and depriving the conſtitution in this manner of its nouriſhment, does not ſeem to retard or leſſen the antiſcorbutic effect of the fruit. Theſe are facts too ſtubborn to be overcome, and they confirm, beyond the poſſibility of doubt, that there is *a ſtate of the body to be corrected, beſide the debility.*

The learned phyſician to the fleet, himſelf, affords us another ſtriking proof in ſupport of what I have juſt ſaid. "When the fleet arrived "at Barbadoes, in May, 1781, part of the ſol- "diers who had ſerved as marines, were affected "with the Scurvy, and being ſent to the army "hoſpital, where, at that time, no freſh animal "food was allowed; they recovered *much faſter*, "being confined to vegetable articles, than the "ſeamen who were fed upon *freſh animal food*, "without any freſh vegetables." *

This paragraph, certainly, ſpeaks as plain as language can do, and is perfectly applicable to our purpoſe. It ſays, that Scurvy was not cured ſo faſt by a diet of animal food, the moſt nouriſhing of all diets; as it was by one altogether vegetable, one, that is well known to weaken the body, and ſubſtract nouriſhment from it. The concluſion that follows, is, therefore, of courſe,

* Blane, p. 301.

that

that the whole doctrine of the remote cauſes inducing Scurvy *ſolely*, by a gradual diminution of the vital power, muſt fall to the ground.

Had the author of the above quotation in his meritorious attendance of the Britiſh fleet laſt war, carried his opinions into practice, that the Scurvy was rather owing to *deficient* nouriſhment than any thing elſe; a diet of animal food, as being the moſt ſtrengthening, was, certainly, more likely to fulfil his indications of cure, than the debilitating citric acid. It was that ſort of fare that was beſt ſuited to diſtend the veſſels, with healthy nutritious juices, to give the blood a denſer conſiſtence, to repair the waſte in the ſyſtem, and to excite the primary moving powers to ſtrong and vigorous contractions.

The following paragraph of Dr. Milman's, demands particular attention; ſpeaking of the ſymptoms of Scurvy, he ſays, "if the circum-
"ſtances of the remote cauſes varied in the

" ſlighteſt degree, the dimunition of the vital " power would be modified by that difference in " them, and the effects and ſymptoms reſulting " from it, would not be thoſe of the Scurvy, " but of another diſeaſe, though related to it in " many particulars." This he illuſtrates by the following remark. " In the neighbourhood of " the Alps, which are covered with perpetual " ſnow, where cold concurred with a ſcarcity of " proviſions, a Scurvy was produced; but during " a ſimilar famine in the mild climate of Naples, " petechial fevers, and dry gangrenes were the " chief diſeaſes." * But there are two ways of applying this fact, and let us firſt try it by the following method. Let the ſtandard of health be fixed at a given number, at 40 for inſtance. All debilitating powers applied to the body, will have their degree of action in this ſcale, and each will produce its diſeaſe. One power, as famine in the mild climate of Naples, will re-

* Page 76.

duce

duce the body to 30, which we ſhall call petechial fever; but the ſame debilitating power joined to another, as famine with cold, in the neighbourhood of the Alps, will bring it to 28, which may be called Scurvy. If this explanation can be admitted, it is, no doubt, accounting for the operation of noxious powers in the human body in a very ſimple manner indeed; but we can admit no ſuch application and reaſoning on the fact; for we find no ſtimulating and reſtorative properties in the citric acid, equal to excite the body ſo ſuddenly from a ſtate of debility that is 12 degrees below the ſtandard of health. We would, therefore, account for the fact in a very different manner. In the neighbourhood of the Alps, which is covered with perpetual ſnow, the rigorous ſeaſon had deſtroyed all vegetation, and among the reſt the oleraceous herbs; ſo that the Scurvy was the conſequence of the famine: but in the lower ſituation, and warmer climate of Naples, putrid fevers were the conſequence: the weak nouriſhment had prediſpoſed the body to

receive

receive the contagion of Typhus; but the produce of freſh vegetation had effectually ſecured it from Scurvy, which would have alſo ſaved the inhabitants of the Alps had they poſſeſſed it. We are acquainted with no modification of the remote cauſes that influences the operation of a ſea diet. From the moſt northern latitude of the artic circle that has been navigated, to the equator, its effects have been conſtant and uniform in producing one diſeaſe. We, ourſelves, have witneſſed the appearance of Scurvy, in the ſame ſhip's company, from the northward of Shetland to within the Tropics, and in many of the intervening latitudes, and can allow no other modification of the remote cauſes, but what ariſes from the deficiency of freſh vegetable matter. The effects of ſea diet are not even altered by the concurring action of humidity, fatigue, preceding illneſs, ſedative paſſions, &c. though theſe will occaſionally accelerate the approach of ſcorbutic ſymptoms.

Doctor

Doctor Lind muſt have found the approved method of cure, to accord very little with his notions concerning the production of the diſeaſe, and the proximate cauſe which he aſſigned; he ſays little about it to the purpoſe. Doctor Milman, however, who is always ready to extend Lind's ideas of the ſubject, is, evidently, biaſſed by his theory, and is extremely inconſiſtent in reconciling the practice with the reaſoning he has adopted. I flatly deny that the lemon juice is rendered moſt efficacious by diluting it with warm water or gruel; its beſt form is to let the patient ſuck it from the fruit. The effects of the citric acid we are informed were ſudorific and diuretic. Is it not as much a ſoleciſm in language to ſpeak of an evacuant reſtorative, as to ſpeak of an evacuant antiſceptic? * What have ſudorifics to do with ſupplying nouriſhment, in a diſeaſe that has been cauſed by a diet affording none? As the cure proceeds, the ſkin no doubt, becomes ſoft and relaxed. But if lemon

* Milman.

juice

juice could be ſuppoſed to communicate a ſtimulus to the ſurface of the body, and act as a ſudorific, is it a rational method, to cure a diſeaſe, in which the body is exhauſted by indigeſtible diet? Certainly, not. The diuretic effect of the juice is alſo to be aſcribed to the watery principle with which it abounds; for there is ſeldom any præternatural accumulation of water in the body: it could not, therefore, be owing to any increaſed tone and contractility, imparted by it to the abſorbents, the renal artery, or the general circulating ſyſtem of veſſels. The Peruvian Bark is coldly ſaid, to "be ſpoken of by ſome authors as being "of remarkable uſe in ſome caſes of Scurvy." * We have already given our opinion of it; Doctor Lind's was much the ſame; but could the learned Doctor Milman, paſs ſo quickly over the medicine which has been ſo deſervedly extolled for its tonic powers without aſking himſelf, why does not every writer on Scurvy bear teſtimony

* Milman, p. 192.

of

of its efficacy? Aſſuredly it may be anſwered, becauſe it does no good there; ſomething more than tone is to be firſt reſtored to the body.

With reſpect to what Doctor Lind ſays of the people whom he debared of eating green vegetables, fruits or roots; he only draws a negative concluſion, "*they in general grew better.*" He did not ſay any of them were cured. When he endeavoured to diſcover the comparative effects of fruits and vegetables, he did not obſerve any ſuperior antiſcorbutic virtue in the eſculent articles he mentions, above the hoſpital broths with beef and greens. This only ſhews that the broth, with the vegetables uſually boiled in it, was equal to creſſes, &c. but he does not deny the ſuperior efficacy of the fruit which poſſeſſes the citric acid. He agrees to this elſewhere, and confirms by his teſtimony what every practitioner has done, ſince the lemon was firſt taken to advantage, near two hundred years ago.

I am willing to allow as much credit as ought to be given to thoſe caſes of Scurvy, that were cured or relieved by whatever raiſed the ſpirits of the patient, ſuch as good news, &c. but I muſt confeſs, ſome of theſe relations appear to me much exaggerated. What I particularly allude to, is Vander Mye's narration of the ſiege of Breda, and that of our own countryman, Mr. Ives, in the Mediterranean fleet. How a diſeaſe, attended by a train of ſuch ſingular ſymptoms, acquired in the manner that Scurvy uſually is, ſhould, all at once, be cured by any exciting paſſion of the mind, ſeems, indeed, wonderful. But, admitting, for a moment, that the diet which induced the diſeaſe at Breda, and in the Mediterranean fleet, acted ſolely by exhauſting the body, and weakening the nervous energy; would it not be multiplying incredibilities to aſſert, that belief in a doſe of a wonder-working balſam, or the joy of conquering an enemy, could make up, in ſo ſhort a time, for a long deficiency of nouriſhing food? It would look like

like reviving an age of miracles, to ſay, that the bloated face aſſumed its ruddy hue, the contracted hams became ſtraight, and their hardened muſcles recovered their mobility in proportion to the glad tidings. Doctor Lind, in his Note, after relating the caſes at Breda, did well to aſk, whether or not the ſpeedy recovery of the patients might not be owing to the decoction of green herbs beginning to ſprout up, at the time the Prince of Orange ſent the three phials to their relief; but, on the other hand, he is unwilling to allow any effect to five ſervings of *broth* and *greens* to the crew of the Dragon, in the Bay of Hieres, before the engagement.

I have no doubt but the buoying up the hopes of the patient, ſo conſtantly depreſſed in Scurvy, may go a great way in aſſiſting the means of relief; but if we expect more it will introduce a careleſs practice, and may do harm.

Our arguments, therefore, againſt the doctrine of debility, enable us to draw the following general concluſions:—

I. That a ſeaman's diet, as conſiſting of ſalted meats, &c. does not produce Scurvy, by weakening the digeſtive organs from its indigeſtible nature; and thereby abſtracting nouriſhment from the body.

II. That the debility which accompanies Scurvy cannot be cured by thoſe means, which are found, in other caſes, to be the moſt effectual in reſtoring the tone, tenſion, and contractility of the weakened muſcular fibre. And

Laſtly, That the proximate cauſe of Scurvy, is ſtill to be ſought for, from ſome peculiar ſtate of the blood.

Notwithſtanding the many difficulties which oppoſe every theory of Scurvy hitherto offered,

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I am very unwilling to ſit down contented with our preſent knowledge of the diſeaſe. What we now know, may, to ſome appear ſufficient for the purpoſes of curing it; but I muſt confeſs, I am not ſo fully ſatisfied. The farther our inquiries and obſervations go, we ſhall be the more certain in preſcribing means of prevention: but by perſevering induſtry in collecting facts, we may probably gain from the aſſiſtance of medicine, what is now only to be found from recent vegetable matter; and freſh vegetables, it is well known, are difficult to be procured, where the diſeaſe is moſt fatal, viz. in ſhips at ſea.

The only change in the ſtate of the blood that is properly authenticated by writers on Scurvy, appears to me to be in the colour. At a time when I had no intention of being an author on the ſubject, the dark, if not black colour of the blood always ſtruck me. In page 36 of the firſt edition of my Obſervations is to be found the following Note:—"The blood that flowed

"from

"from theſe hemorrhagies was always of a *darker* "*colour than natural.*" I have made it my buſineſs to aſk ſome of the moſt intelligent navy ſurgeons, if they had ever obſerved the colour of the blood changed. The remark I find is general; Doctor Lind, in his Poſtſcript, where he deſcribes the blood as he took it from different patients, mentions only one, where it was of a ruddy colour; this patient he ſaid was feveriſh likewiſe. But he was particularly attentive only to the coagulation; and, probably, theſe patients had all taken freſh vegetables before he bled them. From what we have ſeen of a ſcorbutic ulcer, in twelve hours after the uſe of lemons, I am apt to believe that this ruddy colour is very quickly reſtored to the blood. But Lind, in narrating the ſymptoms, allows the change of colour fully. "When we examine, ſays he, "narrowly, the lips or corners of the eye, where "the blood veſſels are moſt expoſed, they appear "of a greeniſh tinge." Now this is remarked among the firſt ſymptoms of the firſt ſtage of Scurvy.

Scurvy. He adds, a little below, "the colour of "the face becomes afterwards more darkiſh or "livid, and the gums have an unuſual livid ap- "pearance." He admits the fact in its moſt extenſive meaning in other ſtages of the diſeaſe. The change is, certainly, expreſſed in the moſt lively manner, on the cheeks and lips, where the ruby colour diſappears, not to mention the black ſpots over the body, the black cloat on the ſurface of the ulcers, and the pieces which occaſionally fall from the gums. Other authors, are ſtrenuous in giving their teſtimony to the ſame change of colour: Doctor Grainger, in his letter to Lind, ſays, it is of a *livid colour*. The following account is given in Doctor Lind's Book from Lord Anſon's Surgeons. "In the "beginning of the diſeaſe, the blood, as it flowed "out of the orifice of the wound, might be ſeen "to run in different ſhades of light and dark "ſtreaks. When the diſeaſe increaſed, it ran "thin, and ſeemingly very black; and after "ſtanding ſome time in the porringer, turned "thick,

" thick, of a dark muddy colour. In the third " degree of the diſeaſe it came out as black as " ink. In diſſected bodies, the blood in the " veins was ſo entirely broken, that by cutting " any conſiderable branch, you might empty the " part to which it belonged, of its black and yel- " low liquor; and when found extravaſated it " was all of the ſame kind. Laſtly, hemorrha- " gies were frequent, at the latter end of the " calamity, the fluid had the ſame appearance as " to colour and conſiſtence, whether it was diſ- " charged from the mouth, noſe, ſtomach, inteſ- " tine, or any other part."

Rouppe, De morbis Navigantium, made the following remarks on the colour of the blood. " In the firſt ſtage the blood as it flowed from " the veins, was thick and black; and after " ſtanding, ſeparated into a yellow water or ſe- " rum, and a grumous maſs. In the ſecond " ſtage, the blood was pretty much in the ſame " condition, with this difference, that it flowed

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"with greater difficulty from the veins, and was "of a darker colour. Some drops of it received "upon clean linen did immediately coagulate. "This blood, after ſtanding ſome hours, depoſi- "ted a thick muddy ſediment, and the ſerum "became reddiſh. In the laſt ſtage, the blood "was quite black, and became for the moſt part, "ſoon covered over with a thin greeniſh pellicle, "which was eaſily removed; the grumous maſs "was not ſo ſtrongly coagulated as in the former "ſtages. There was, however, always a diſtinct "ſeparation of the parts of the blood." Rouppe, Sect. 2. Cap. 2.

It ought to be remembered that this author mentions the coagulation of the blood: therefore, in confirming the preceding quotations, he cannot be accuſed of favouring the putridity of the vital fluid. We have thus ſatisfied the moſt ſcrupulous inquirer, from the concurring teſtimony of the moſt reſpectable authors, as well as our own obſervations that the florid healthy co-

lour of the blood, is changed in Scurvy, to livid, darkiſh, and even a black ſhade.

Various have been the opinions of philoſophers concerning that principle which gives the red colour to the vital fluid. It is a general remark among phiſiologiſts, that the venous blood is always of a darker colour than that of the arteries. The florid colour ſeems, therefore, to be gradually changed and expended in the courſe of circulation from the heart to the extreme veſſels on the ſurface of the body. It is alſo found again reſtored in the paſſage of the blood through the lungs, by the action of ſomething which it receives from the atmoſphere during reſpiration.

Much light has lately been thrown on this ſubject from the experiments of Dr. Edmund Goodwyn, firſt publiſhed in his Inaugural Diſſertation at Edinburgh, and ſince that time in Engliſh, under the title of *The Connexion of Life with Reſpiration.*

Reſpiration. From the accuracy and addreſs with which theſe experiments were conducted by this ingenious young phyſician, much, it is well known, can be truſted to them. Doctor Goodwyn's trials fully confirmed the opinion, that the blood received its more florid colour during the action of reſpiration; and this he aſcribed to the chemical effect of the pure part of the atmoſpheric air, commonly called dephlogiſticated air.

But ſome collateral experiments in Doctor Goodwyn's Work, juſtify the concluſion, that vital air, in other ſituations will change the dark complexion of the blood to a florid colour. He ſays, " but it has been often aſſerted, that " that black blood freſh drawn, and expoſed to " dephlogiſticated air, becomes florid.

" To aſcertain the truth of this aſſertion, I in- " incloſed a quantity of dephlogiſticated air, in a

" glaſs receiver inverted in quickſilver, and in-
" troduced into it four ounces of blood freſh
" drawn from the jugular vein of a ſheep: the
" blood became inſtantly very florid, and the
" quickſilver ſeemed to aſcend a little in the re-
" ceiver. To aſcertain this latter circumſtance
" I repeated the experiment three or four times;
" the change of colour was always very ſudden,
" and after ſeveral minutes, the quickſilver
" aſcended two or three lines. It is evident,
" then, that dephlogiſticated air changes the co-
" lour of black blood, and a ſmall portion of the
" air diſappears in the proceſs; but as the
" changes in theſe experiments are ſimilar to
" thoſe in reſpiration, it might be inferred, that
" dephlogiſticated air produces the florid colour
" in both examples." Page 62.

Theſe experiments render it highly probable that the black colour of the blood in Scurvy is owing to the abſtraction of this principle by the remote

remote cauſes; and we ſhall ſtrengthen the opinion ſtill more, by ſhewing that vital air is a component principle of freſh vegetables, but particularly of theſe that are found moſt effectual for the cure of this diſeaſe.

It is, I believe, a fact now fully eſtabliſhed, that Scurvy is never found, where there is a due ſupply of freſh eſculent vegetables. The caſes on record to the contrary are few; and there is not an inſtance where the prevention and cure could not be fully accompliſhed by the acid fruits; at leaſt as far as human knowledge extends in preventing and curing diſeaſes. The inveſtigation of this principle, we hope, therefore, will throw very conſiderable light on the ſubject of the proximate cauſe of Scurvy.*

Doctor

* The principal objections againſt this opinion, are the Scurvies which happened in Hampſhire and Wincheſter Priſon in 1759. But to do away the firſt, Doctor Lind, himſelf, adds, "The account here "given, does not detract from the antiſcorbutic qualities of green "vegetables,

Doctor Lind ſeeking for this principle in vegetables, plainly diſcovers how much his ideas were fettered by his favourite doctrine of deficient nouriſhment, and the debility of the digeſtive organs, which in this inquiry has betrayed him into many errors. He ſays, "recent vegetables, freſh plants and fruits, are of a "more tender texture then animals; and their "parts being more eaſily ſeparable, they yield "more readily to the dividing powers of our or-"gans." Speaking of the antiſcorbutic herbs, he adds, "theſe herbs not only ſtrengthen the "tone of the ſtomach, and invigorate the organs "of digeſtion, but reſtore the ſuppreſſed excre-"tions, promote a copious flow of urine, and "increaſe every ſecretion of the body, which is

"vegetables, as it is probable, that without their aſſiſtance, few of "thoſe patients would have recovered."—Page 274. And to remove the objection at Wincheſter, among the French priſoners; Mr. Lloyd, the ſurgeon, tells us, that they were allowed greens all the preceding ſummer in place of peas, till within *two months* of the time that theſe ſcorbutic complaints became ſo general. Lind, p. 277.

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"the moſt *eſſential quality* of an antiſcorbutic "compoſition. That they ſtrengthen the powers "of digeſtion, appears not only from the quick "increaſe of appetite occaſioned by them, but "from the breakings of wind, which follow "each doſe." * What I have before ſaid on the debilitating effects of vegetables upon the ſtomach might ſeem to anticipate any remark here. How the eſſential quality of an antiſcorbutic compoſition, is to be determined by its promoting and increaſing the ſecretions, I am at a loſs to underſtand, unleſs ſomething noxious is to be eliminated from the body. To fill the veſſels for the purpoſe of emptying them is an abſurdity in meaning and terms. But the doctrine is utterly inadmiſſible, that plants and fruits are more tender, and eaſier to be divided by the organs of digeſtion than animals. The venerable author of the above quotation in his practice, muſt have often diſſuaded his dyſpep-

* Lind. Part II.

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tic patients from indulging the uſe of vegetable diet; at leaſt not without certain reſtrictions. I knew a lady ſo miſerably afflicted with theſe painful affections of the ſtomach, that ſhe was often under the neceſſity of giving up every kind of vegetable food; even the beſt fermented bread became uneaſy; ſo much ſo, that ſometimes her diet has been for weeks ſolely of an animal nature. I ſaw her once under theſe circumſtances, when ſhe had many ſymptoms of the Scurvy, ſuch as ſpongy gums, livid ſpots on her arms and legs, &c. At this time ſhe loſt one or two of her teeth; but the indigeſtion wore off, and ſhe ate pot herbs for ſome time without any inconvenience. Nothing is more generally agreed among phyſicians, than, that medicines, ſtimulant and tonic, with a correſponding diet, ſuch as a large proportion of animal food, with the ſtronger wines, Madeira and Sherry, are the beſt reſtorers of depraved digeſtion. We are, therefore, to reject the man-

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ner in which Doctor Lind explains the antiſcorbutic quality of recent vegetables.

The ſuperior efficacy of the acid fruit in the cure of Scurvy is ſo well aſcertained, that it might ſeem ſuperfluous to add any freſh remark to what is ſo fully admitted. Theſe articles are certainly more beneficial as they approach to the nature of the citric acid, which, is that abounding in the lime, lemon, &c. Our ſummer fruit in this country, ſuch as the apple and gooſeberry, loſe their acidity as they come to maturity; ſo that in their immature ſtate they poſſeſs moſt of that principle valued in the cure of Scurvy. In all caſes of Scurvy which I have attended, I have remarked, the longings and deſires of the patient for acids; which, alſo, have been mentioned by ſome of the earlieſt writers on the diſeaſe, and more or leſs by others ſince that time. It is one of the ſtrongeſt inſtincts in nature that we are acquainted with.

Having repeatedly obſerved the ſcorbutic ſlaves throw away the ripe guavas, while they devoured the green ones with much earneſtneſs, I reſolved to try if there were any difference to be remarked in their effects. For this purpoſe I ſelected nine blacks, affected in nearly a ſimilar degree with Scurvy. To three of theſe, I gave limes, to three, green guavas, and to three, ripe guavas. They were kept under the half deck, and ſerved by myſelf twice or thrice a day. They lived in this manner for a week, which was about the time we left the coaſt of Africa; and it is to be remarked, that the three Negroes reſtricted to the ripe guavas continued in much the ſame ſituation, while the others were almoſt well.

After the long cruize of Sir Charles Hardy's fleet, in the ſummer of 1779, in the channel, a few of the raw ſailors in the Berwick were tainted with Scurvy. It was not, at that time, thought neceſſary to ſend them to Haſlar Hoſpital; but they were permitted to go on ſhore

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to the Iſle of Wight, for the benefit of air, exerciſe, and what fruit they could pick in the woods, under the care of an old ſeaman, called Robert Wood, who pretended to great knowledge of antiſcorbutic herbs: it was, however, obſerved, what he pointed out for their uſe, were the berries and herbs poſſeſſing the acid quality, which he diſtinguiſhed by taſting.*

In order, therefore, to diſcuſs this ſubject as briefly as poſſible, we ſhall endeavour to find out the nature of the citric acid, as abounding in the lemon, for an example of the whole.

Every ſubſtance in nature which poſſeſſes that quality which is diſtinguiſhed by the term *acid*, is found to be compoſed of the acidifying principle, and a baſe peculiar to itſelf. This conſtitutes the difference of acids; each has its own radical; but what communi-

* In relating theſe facts, I beg leave to be underſtood, as having no intention to ſupport the doctrine of a *Vis medicatrix Naturæ*.

cates acidity to the whole is vital air, or the dephlogiſticated air of Doctor Prieſtly. This fact is now ſo fully explained from the experiments of modern chemiſts, that no room is left to ſuſpect its certainty; it would therefore, only lead to a fruitleſs prolixity to repeat the authorities which ſupport it.

Since, then, it is agreed that vital air, or what is more properly called *oxy gene*, is a component principle of the acid fruits, we have reaſon to conclude, that this is the quality which they reſtore to the human body in Scurvy. We have proved that the blood in this diſeaſe is altered in colour from its natural ſtate; that inſtead of a florid, it is changed to livid and black; and we have found from Doctor Goodwyn's experiments, that vital air is the principle in nature which reſtores the florid colour to the vital fluid; from which the concluſion is obvious, that the *effect* of the citric acid is owing to this quality. The proximate cauſe of Scurvy is, therefore, nothing elſe but a ſomething abſtracted

ted from the body, by the remote cauſes; and from what has been juſt delivered, we pronounce that to be vital air.

We are of opinion that the citric acid is decompoſed by the organs of digeſtion and aſſimilation, after which the oxygenous principle is by chemical attraction blended with the circulating maſs; but what other changes it may undergo there, beſides giving the blood a florid colour, we are not bound to explain.

The firſt change which I have remarked in ſcorbutic caſes, after the uſe of lemon juice, is the ſudden alteration of the ulcers. The livid complexion of the ſore itſelf, with the black cloat of blood on their ſurface, diſappears, oftentimes in leſs than twenty-four hours. The ulcer becomes florid, the cloat of blood is not regenerated, and a ſmaller quantity of pus than is uſually found in other ſores of equal ſize, is the conſequence. The patient in the inveterate ſtage of the diſeaſe ſeems to gather

gather ſtrength even from the ſight of the fruit; the ſpirits are exhilirated, by the taſte itſelf, and the juice is ſwallowed, with emotions of the moſt voluptuous luxury. The gums are gradually hardened, and the teeth fixed in their ſockets. The dull eye and bloated looks in a few days, put on the clear healthy complexion, which alſo extends to the whole ſurface of the body. The abſorption of the effuſed blood in different parts goes on rapidly, and by marking the ſpots, you may calculate the progreſs of the abſorption, and cure of the diſeaſe. This abſorption beſpeaks a degree of ſtimulus communicated to the lymphatic ſyſtem as well as the ſanguiferous, as ſoon as the blood has received a ſufficient quantity of the vivifying principle. From the effects of the juice upon the bile, the colour of the ſtools is changed, and a lax ſtate of the bowels is the conſequence. But it is to be obſerved, that this laxity of the inteſtines may be moderated by giving the fruit in ſmaller quantities: a ſpeedy cure, however, demands

that

that they ſhould be given *ad libitum*, and the greater number of lemons taken in a day, the recovery will be more rapid in proportion. The emaciated ſtate of body formerly mentioned, does not ſeem to be altogether owing to the purging, carrying the nouriſhment away; but it is probable that a proportion of undecompoſed acid, ſo affects the aſſimilation of the aliment, that it is taken unprepared into the blood veſſels, peculiarly acts upon the fat, reduces it to a ſaponaceous ſtate, and diſpoſes it to run off by the excretions, thereby inducing a waſting of the fleſhy parts, and adipoſe ſubſtance.

But it will, no doubt, be aſked in oppoſition to the proximate cauſe we are wiſhing to eſtabliſh, and the principle which we ſuppoſe the citric acid to communicate to the blood; how comes it that every acid is not equally effectual in the cure of Scurvy, ſince they all poſſeſs this common principle, and many of them in a much

much greater degree than the lemon juice? This would appear, at firſt ſight, rather inexplicable; but we hope to do away the objection completely.

The oxgenous principle, like that of all bodies, which have been the ſubjects of chemical experiment, is found to poſſeſs different degrees of attraction for the ſubſtances with which it comes in compoſition, and for the radicals of the various acids to which it communicates an acid quality. In the celebrated table exhibiting the chemical nomenclature; propoſed by Meſſrs. De Morveau, Lavoſier, Berthollet, and De Fourcroy, in May 1787, are to be found, theſe bodies, of which oxogene is a compound, arranged according to the degrees of elective attraction, or affinity as it is called by the French chemiſts. At the top of the column is water, next follows nitric acid, carbonic acid, ſulphuric acid, &c. and not till after the tartarous acid, come the oxalic,

oxalic, gallic, citric, and malic acids: hence theſe acids by being more eaſily decompoſed, or their radicals and the oxygene, being combined in weaker degrees of attraction, they are acted upon by the powers of digeſtion and aſſimilation of the human body; by which means they become ſubjected to the animal proceſs, and form new combinations with our fluids. The oxalic acid which is found in ſugar, &c. has often cured the Scurvy, but this effect has not been known from any plant that affords it, but the ſorrel. In ſugar it is combined with ſo much vegetable mucilage as not to be decompoſed. The malic acid, found moſt pure in the unripe apple, and combined with the oxalic and citric acids in moſt kinds of fruit, is a valuable antiſcorbutic, and if uſed while the apple is in its immature ſtate is equal to the lemon. The green gooſeberry poſſeſſes theſe acids in great perfection.

But, further, another objection may be ſtill urged. Since theſe acids which cure the Scurvy, viz. the malic, citric, and oxalic, can by combining more oxygene with them, be converted into one another, in the manner they are ſet down in the above line; and then, by adding ſtill more oxygene, be reduced to the pure acetic acid or radical vinegar; how does it happen that this laſt ſubſtance has never cured the diſeaſe, though given ſometimes in very large quantities? We can only obviate this objection, by aſſuming it as a matter of fact, that by encreaſing the proportion of oxygene or bringing the radical to a more perfect ſaturation, we alſo increaſe their reciprocal attraction; by which means they undergo no decompoſition in the body, but only act upon the fat, and diſpoſe it to run off by the excretions. But this is ſtill more confirmed by the nitric and ſulphuric acids; where the acidity approaches to the higheſt degree, and

and in whatever manner they are exhibited, they pass through the body pure, and unaltered, as when taken into the stomach.

Many facts and experiments are, no doubt, wanting to give this theory stability; and it is offered to the learned with extreme diffidence. A substance that exerts such wonderful powers on the face of creation, has certainly its share in the internal œconomy of nature. The history of *pure, vital air*, comprehends the respiration of animals, the heat of the blood, and probably the hitherto unexplored subject of secretion. In vegetation it is equally useful: it is a component principle of water; it alone supports combustion; by it metals are calcined; it is the oxygenous principle in nature; in short its influence is unbounded, and the modifications of its agency are beyond calculation.

The *Ratio Symptomatum* in Scurvy is certainly a difficult ſubject to enter upon. In what manner a diſeaſed ſtate of the blood communicates its influence to the moving powers of the body we are at a loſs to explain. The Scurvy, however, is not the only diſeaſe of this kind; and the contracted hams, pains of the ſhin bones, &c. are no more inexplicable than the phenomena of fever, which follow the abſorption of variolous matter. It may, perhaps, favour ſomething of the Stahlian ſyſtem of an *adminiſtering ſoul*, to trace the ardent longings and deſires of ſcorbutic patients for recent vegetables: no fact, however relating to the diſeaſe, has been more generally remarked, whatever we are to aſcribe to a *Vis medicatrix Naturæ*. No ſymptom appears more ſingular than the cloat of blood covering the ulcer in the inveterate ſtage of the diſtemper. Certainly no *ſolution of continuity*

in

in any other diſeaſe of debility preſents a ſimilar appearance. No ſtate or condition of the moving fibre, can be adduced from analogy to account for this wonderful change in the effuſed blood. It cannot be owing to the external air, for cover the ſore in whatever manner you pleaſe, the maſs will be ſhortly regenerated. How cómes it alſo, that the ſerous parts, by any ſtimuli applied to the ſore, ſhew not the leaſt diſpoſition to be converted into pus as in other caſes? The pains of the ſhin bones, though reſembling ſyphilitic pains in the ſame bones, by becoming worſe in bed, yet they differ from them, in never ending in nodes, tophs, &c. And indeed the Scurvy is attended by a train of ſymptoms peculiar to itſelf, and which the genius of the diſtemper has rendered extremely difficult to explain.

On the whole, if we have not eſtabliſhed a new proximate cauſe, we have proved to demonſtration

demonſtration that the late theories of Scurvy, however ſpecioufly defended, are illuſive, as tending to miſlead the practitioner; and therefore another mode of inveſtigation was wanting that might arrange, and comprehend the knowledge which recent obſervation has accumulated on the hiſtory and practice of Scurvy; and it remains to be decided now, whether or not our proximate cauſe correſponds with the largeſt ſtock of facts hitherto collected on the ſubject.

SECTION

SECTION III.

PREVENTION AND CURE OF SCURVY.

AFTER what has been ſaid by ſo many able phyſicians concerning the prevention of Scurvy; a diſeaſe whoſe cauſes and cure, however we may diſpute about their action, are ſo well aſcertained, it may ſeem aſtoniſhing that it ſhould ſtill be the ſcourge of long voyages and a ſea life. This, however, is in part irremediable. Few ſhips can be ſuppoſed to carry with them an allowance of freſh vegetables to ſupply a crew of ſome hundreds for a long cruize or ſtation at ſea. Ships of war whoſe motions muſt depend on the manœuvres of the enemy, have often ſuffered by the want of theſe articles. Thus, the

the hiſtory of the diſeaſes of ſeamen, during the late war, ſufficiently ſhows the dreadful ravages, which Scurvy continues to make on certain occaſions. Even in the Weſt Indies where actual ſervice ſeldom called the Britiſh fleet, out of ſight of iſlands abounding with fruits, the moſt valuable for both prevention and cure; yet there ſeemed ſcarce a period in this whole warfare, that the Scurvy did not rage in different degrees. But the wiſe regulations that were latterly adopted from fatal experience, in ſome meaſure counteracted the mortality of ſeamen; and the end of the war was remarkable for the healthy ſtate of many ſhips in the Weſt India fleet.

The prevention of Scurvy in his Majeſty's ſhips of war, is connected ſo much with rules for the general health of ſeamen, that we ſhall not confine our Obſervations altogether to this diſeaſe: I ſhall, therefore, begin with making

making ſome remarks on the method of recruiting our navy by the impreſs ſervice.

The ſubject of impreſſing ſeamen ſince the laſt war, has employed the attention of ſome able politicians; but every plan hitherto propoſed, has been given up, as not likely to anſwer, the intention of ſervice, or the exigencies of the ſtate. It is a pity, however, that the inquiry ſhould be abandoned. To keep a naval militia ready to man our fleet on a ſudden emergency, has from the nature of their employment been thought utterly impracticable. The expences attending ſuch an undertaking, ſeem alſo to fruſtrate any endeavour to carry it into execution. But, I am apt to believe that an eſtabliſhment of ſeamen, on a certain plan might be ſupported at ſmaller expence to the people than at firſt we are aware of. Such we apprehend of the following:—

The firſt propoſal that I have to make as a preliminary; is to take ten thouſand men from the preſent eſtabliſhment of the army. In lieu of this reduction of the army fifteen thouſand ſeamen ſhall be embodied, under their own officers. Theſe, when on ſhore, ſhall be trained as ſoldiers to military exerciſe, be diſtributed throughout the country bordering on our naval ſea ports, and do duty in garriſons as an army. The preſent peace eſtabliſhment of ſeamen, excluding marines, does not exceed fifteen thouſand, but with the body which we have propoſed as a naval militia would make the number thirty thouſand; a body ſufficient to man our fleet with ſeamen, while the landmen could be eaſily procured.* The fifteen thouſand men, that are embarked in the different ſhips, ſhall be changed for thoſe on ſhore, at the expira-

* To complete them with landmen I would recommend the recruiting ſervice, and a large bounty.

tion

tion of every three years. The cloathing of all theſe men, whether on board or on land, ſhall be a complete naval uniform; conſiſting, of blue jackets, white waiſtcoats, white trowſers, a ſmall round hat or cap, with other articles to fit them for ſervice. While employed on the garriſon duty, the different ranks of officers and men as eſtabliſhed in the navy ſhall be ſtrictly attended to, that occaſional ſupplies may be ſent on board as wanted to fill vacancies.

I am aware that this plan may be objected to, as bringing the navy too near to the form of the army, which might change the blunt courage of our ſailors. But this cannot be urged as an objection. It is cuſtomary to train every ſailor on board to the uſe of ſmall arms, and their duty in different parts of the ſhip is to ſtand as ſentinels. It would, moreover, extend ſubordination and good order throughout the navy, which would effectually prevent that ſpirit of mutiny and diſaffection that

on ſome occaſions have likely to been attended with fatal conſequences, and could not fail to add freſh ſtrength to the naval character of theſe kingdoms.—But to our purpoſe.

During the late armament againſt Spain, many opportunities offered, while I was ſurgeon of the Royal William, a receiving ſhip at Spithead, of knowing and ſeeing the many inconveniencies attending this branch of ſervice. But it is, perhaps, more to be wiſhed than expected, that any regulations can forward the buſineſs, without ſome unpleaſant circumſtances, to the public or individual. In the firſt place I am very well convinced, that what is called the regulating of men by the different officers, was not only careleſsly conducted in London, but at many other ports. Tenders were employed to bring ſeamen to Spithead from all the different ſeaport towns, between the Downs and Torbay; many

many of theſe were men cruelly torn from their families, and the only department in which they could benefit ſociety, to croud the naval hoſpitals and heap expences on Government. Out of about ſeven thouſand men received on board the Royal William, and diſtributed into different ſhips by Vice Admiral Roddam, at Portſmouth and Spithead, near five hundred were ſent by ſick tickets to the hoſpital at Haſlar; this excludes all who were invalided at the monthly ſurveys, who might amount to one hundred and thirty more. So large a proportion as this, ought in future armaments to awaken the vigilance of the Admiralty Board to guard againſt it.* This would be eaſily accompliſhed by employing more regulating officers, as captains and ſurgeons. It is only a ſurgeon that has practiſed in the navy, and been familiar with the manners

* The five thouſand volunteer ſeamen voted by the Iriſh Parliament in 1782, were many of them invalided at Plymouth after a vaſt expence to Government.

and

and diſeaſes of ſeamen that ought to be truſted in ſuch an employment. The men as regulated, ſhould be immediately cleaned if they need it, and ſupplied with cloaths and bedding. A ſuit of jackets, &c. with two ſhirts, two trowſers, ought to be given to every ſailor, who is not ſufficiently cloathed. One veſſel lying off the Tower has generally been deemed equal to the number of impreſſed men at a time; but this is a miſtake. When any buſtle breaks out, for ſome time afterwards, the ſhip is too much crouded, it depreſſes the ſpirits of the men, makes them averſe to enter, and gives them at firſt unfavourable ideas of the navy. There ought, therefore, to be more ſhips than one, in the river Thames to receive men.

The want of cloaths and bedding ſeemed the principal cauſe of diſeaſe among the people ſent from the Royal William to Haſlar Hoſpital. In the paſſage round, &c. many of them

them had been ſix weeks in that ſituation, and lying all the time on the deck. There is a method of ſupplying ſlops and beds in the navy highly reprehenſible. In ſhips ſent out to impreſs men in the channel, or to convey them from one port to another, the captain and purſer cannot iſſue theſe articles, till the ſeamen have pay ſufficient to clear the expence; hence they are never provided, till the commanding officer of the port, ſends them to the ſhips where they are to remain. This uncomfortable ſituation, no doubt, tends to depreſs the ſpirits of impreſſed ſailors, and adds with the diſappointment they experience when returned from a foreign voyage, to pave the way for the attack of that diſeaſe whoſe ravages we have been deſcribing, or ſome other equally fatal in its conſequences.

One happy circumſtance, not commonly met with, in an extenſive armament, attended that,

that, in the ſummer of 1790. Which was, that notwithſtanding the little attention paid to the cleaning and ſlopping the men, yet no contagious fever of any kind, ever made its appearance in the fleet. Somes alarm, indeed, was ſpread from the Elephan t of 74 guns, but it turned out trifling, and was probably owing, to the damp, unſeaſoned wood, with which it has been ſaid that ſhip is built.

Wood improperly ſeaſoned will, on certain occaſions, produce a ſickly crew. After a long cruize of rainy and even foggy weather, we often meet with fevers in a ſhip, attended with all the eſſential ſymptoms and forms of the remittant kind, occaſioned by marſh effluvia. It is probable that the cauſe of theſe fevers is the ſame in a ſhip as on land. Particular care ought, therefore, to be taken in drying the decks, whether after waſhing them or from any other cauſe. The ſtoves employed for this purpoſe at preſent are very well adapted, but they

they ought at leaſt to be doubled in number. The advantage to be reaped from this practice, is to dry up the moiſture in the leaſt poſſible time, and that can in every reſpect be better accompliſhed by four ſtoves, which will do in two hours, what a couple of ſtoves can only do in four. A degree of cold is always produced during the evaporation of the water from the deck, and while it laſts is conſiderably below the temperature of the atmoſphere. This is ſo much the more hurtful, as the people when expoſed to it, are uſing no active kind of exerciſe, and catarrhs and rheumatiſms are its frequent attendants.

It is a matter of doubt with many officers at this day, whether or not a ſhip's well ought to be occaſionally refreſhed by letting in water at the cock. This point may be very eaſily decided. Provided a ſhip can be kept perfectly dry, it is certainly the beſt way to admit no water at all; any little moiſture in

the well, or foul air generated there, can be purified when neceſſary by fires. This ſalutary practice, in every ſhip, even in thoſe laid up in *ordinary*, ought to be regularly attended to, twice a week, and oftener if there is occaſion. But the orlop, the bread room, and hold, ought to undergo the ſame mode of purification by ſtoves, once or twice a week; as having little acceſs to the air, they are ſoon rendered impure, which may be obſerved from the diſagreeable ſmell. It is a common practice in moſt ſhips to ſtow away a great deal of lumber in the wings; but it is a very bad practice; draughts of air ought conſtantly to be thrown along the wings, equally neceſſary for the timber of the ſhip, as the preſervation of health.

It may not, only, be a matter of curioſity, but of ſome practicable utility to deſcribe the nature and production of that ſuffocating damp, which

which in ſome ſituations has been fatal to carpenters employed about the well. It is generated by the decompoſition of the moiſture or water in the well, when it has been neglected ſo long as to ſtagnate. This choak damp, or fixed air, is, from its compoſition, called carbonic acid, by the new Nomenclature. Water is ſaid to be compounded of two kinds of air, inflammable air, or hydrogene, and, vital air, or oxygene: when ſuffered to ſtagnate it undergoes a decompoſition.* The diſagreeable ſmell of ſtinking water in a ſhip's well is owing to

* As we ſhall have frequent occaſion to mention the decompoſition of water, it may be proper to obſerve, that the grand experiment of M. Lavoſier, by which, all at once, this ſubſtance was deprived of the character of a ſimple elementary body, was performed in April, 1784. From that period we are to date the explanation of many phænomena in Nature that were till then unknown. The conſtituent principles of water are, therefore, found to be in the proportion of 0, 86 of oxygene, and, 0, 14 of the baſe of inflammable gas; this laſt, as being the radical of water, has received the name of hydrogene.

Although this beautiful diſcovery has met with keen oppoſition, it has been lately confirmed by both analytical and ſynthetic facts.

the eſcape of the hydrogene, while the other principle, the oxygene, is attracted by the *carbone* of the wood, and forms with it the fixed air, carbonic acid, which is found there. This kind of air, as poſſeſſing a greater gravity than the common atmoſphere, always occupies an inferior ſtratum, and it is not till the perſon deſcends or ſtoops that he feels its noxious influence. It ſeems to act immediately on the nervous ſyſtem, in cauſing death, by affording none of that *pabulum vitæ*, on which reſpiration depends.

The recovery of perſons who have ſuffered from the choak damp of a ſhip's well, is to be affected by means ſimilar to thoſe of ſudden death. The perſon ought to be immediately carried upon the deck, not too far from a fire; the ſurface of the body is to be well rubbed, all over by the hands of two or three people at a time. Volatile ſalts may be applied

plied to the noſe, and now and then a few drops of æther or Sp. C. C. put into the mouth. Air may be thrown into the noſtrils, and the motion of the breaſt and lungs, muſt be imitated, by frequent agitation of the cheſt and abdomen.

When the well has been long neglected, and there is a ſuſpicion that this air may be generated in an unuſual quantity, its noxious quality can be detected by lowering a lanthern and candle to the bottom. As it is an air unfit for ſupporting flame, the candle is immediately extinguiſhed; but if it burns freely, it is a ſign that the air cannot be prejudicial to life. This air is beſt expelled from the bottom of the well, by charcoal ſtoves, or embers taken from the ſhip's fire: by theſe means in a ſhort time, it will be ſo much rarified, and elevated, as to allow a portion of freſh atmoſpheric air to flow in and render it wholeſome,

ſome; when the perſon may deſcend with ſafety.

It has been long a practice in the navy to purify the air of a ſhip with what are called ventilators; I am apt to believe that ſtoves are more effectual, as drying up moiſture they preſerve the wood. What is commonly called the correction or purification of foul air, is nothing more than diſlodging it: the heat of a fire rarifies the contaminated part which aſcends, while a current of freſh air ruſhes in, to reſtore the equilibrium.

It is only from its heat that ſmoke can act as a corrector of contagion; for inſtead of purifying, it renders the air foul. The effect uſually aſcribed to it of deſtroying animalculæ, was founded on erroneous opinions of the nature of infection. Smoaking ſhips with brimſtone, camphor, &c. is ſtill practiſed in his Majeſty's Navy, all of which ought to be laid

laid aſide for the more frequent uſe of ſtoves. I have often ſat in the orlop during the fumigating proceſs, and found no inconvenience; for, as it is the property of ſmoke to aſcend, even though the hatches were cloſed in, none of it came in contact with the inferior parts of the ſhip, which ſtand in moſt need of ſomething to diſlodge the bad air.

Before leaving this part of our ſubject, I muſt beg leave to offer ſome remarks on the practice of charging fifteen ſhillings to ſeamen for the cure of the venereal diſeaſe in a man of war. This will ſeem th e leſs exceptionable, while treating on the Prevention of Scurvy, which is often complicated with ſyphilitic complaints, and the cure of each of theſe diſeaſes is diametrically oppoſite. This cuſtom I had occaſion lately to reprobate in another publication on the medical department of the navy. The arguments I have offered againſt the perquiſite, were principally

founded

founded, on the idea that it prevented men from making their complaints known in time; and when in port it makes them the prey of every ſpecious impoſtor, with which the different ſea ports abound. I have often known a ſailor pay two or three guineas for medicines on ſhore, and be obliged to apply to the ſurgeon of his ſhip, when the diſeaſe had arrived at a degree of virulence horrid to be deſcribed. It ought, therefore, to be aboliſhed as unjuſt and inhùman.* It is peculiarly unfortunate for the men if they go to ſea with complaints that require much mercury; ſo that inſtead of preventing a timely application for medical aſſiſtance, by mulcting them of their pay, they ought the rather to be encouraged to make their complaints known. By the advice of a friend, in my Work a fine of five

* There was lately an inſtance in the Coloſſus, where a ſailor had taken muriate of mercury, for the cure of the pox, in ſuch quantities as to prove fatal in a few days. It is a frequent practice in ſhips, and ſimilar caſes have fallen under my own obſervation.

ſhillings

ſhillings was ſtill to be paid; but I am now of opinion that every claim on the ſailor ſhould be aboliſhed. With the facts ſent to me by the late Mr. Young of Haſlar Hoſpital, which ſo emphatically proved my aſſertions, it was hoped that the bounty of Government would, at leaſt, meet us half way: but this has not yet been the caſe. If the ſurgeons are blamed for ſtill receiving the fine, they may juſtly anſwer with the apothecary in Romeo and Juliet.—

"Our poverty, but not our will, conſents."

Since the introduction of the venereal diſeaſe to Europe, it has in a peculiar manner been the ſcourge of the profeſſion of arms; the roving life of the ſoldier and ſailor, has ſingularly ſubjected them to its virulence; and the difficulty of cure, as it was, till lately, thought to be, induced the ſurgeons of his Majeſty's

Navy to petition the Board of Admiralty for ſome perquiſite annexed to their office for every cure performed on ſhip-board. This was actually complied with; and the King in Council, ordered fifteen ſhillings to be paid by marines, and one pound ten ſhillings by the ſeamen, which were to be charged to their wages. The ſurgeons, however, not content with this allowance, ſome time afterwards petitioned Government afreſh, to double the fine, as it did not indemnify them. But their rapacity was checked, by the then firſt Lord of the Admiralty, who, much to his credit, reduced the fine of the ſeamen to an equality with the marines, where it remains to this day.

Having ſaid ſo much on theſe collateral, though important ſubjects, let us now turn our attention more particularly to the Prevention and Cure of Scurvy in his Majeſty's ſhips.

The

The prevention of all diſeaſes depends upon a knowledge of their remote cauſes, or of theſe noxious powers which have a tendency to produce them. The remote cauſes, are divided into the predispoſing and occaſional cauſes. The predispoſing cauſes of Scurvy, are whatever have the effect of debilitating the body; the chief among them are, preceding diſeaſe, fatigue, cold, and moiſture, impure air, indolence, the ſedative paſſions, want of cleanlineſs, &c. But it is to be obſerved, that no one, or even all theſe cauſes concurring together, can produce Scurvy, without the exciting cauſes; they only render the body more ſuſceptible of the diſeaſe, and accelerate its approach.

The occaſional or exciting cauſes of Scurvy have been called a diet of ſalted or ſmoke dried proviſions, without freſh vegetables. But we have conſidered a deficiency of *recent*

vegetable matter alone, as the occaſional cauſe of Scurvy.—But firſt of the prediſpoſing:

The complete mode of diſcipline, carried on in his Majeſty's ſhips, at this time throughout the navy, is on the whole ſo happily conducted, for anſwering the purpoſes of ſervice, and ſecuring the health of the ſhip's company, that it almoſt anticipates any remark that I have to make. It is certainly the proper ſtudy of every officer ſo to regulate his ſhip, that a healthy crew may be always prepared for action; without this, it is in vain for phyſicians to preſcribe rules of health. But it is not health merely, that is the fortunate reſult of theſe judicious forms of diſcipline: the morality of our ſeamen is undergoing a rapid revolution for the better. Naſtineſs, drunkenneſs, and theft, are almoſt baniſhed from a man of war: the rough ſailor is daily loſing the ferocity of his manners, while

while the true courage that diſtinguiſhes the Britiſh Tar is increaſed, and blending itſelf with more poliſhed notions of principle and honour. This there can be no doubt of. It muſt be a pleaſing ſenſation to the moraliſt, to hear that ſome ſhips of the line, with a complement of 750, were really paid off, at this port, after the Baltic armament, without an intoxicated ſailor appearing at the pay table. This is no leſs ſingular than true; and it is only to be accounted for, from improved diſcipline.

Was the learned phyſician, whoſe opinions on Scurvy I have attempted to refute,* to conſult the private orders given out by the different Captains of the guard ſhips in Portſmouth harbour for the regulations of diſcipline on board, he would not think, that the

* Doctor Milman.

health

health of Captain Cook's crew, was owing to ſuperior officerſhip, over the general practice in the ſervice. After performing ſo arduous a voyage, their healthy ſtate was, no doubt, wonderful, and reflected high honour on the illuſtrious Navigator. But it is to be remarked, that ſhips ſent on diſcoveries have many advantages above common ſhips of war: their tonnage is calculated to carry more water, and other things neceſſary for a long voyage. They are ſeldom long from land, and their commanders are allowed to purchaſe all refreſhments that they ſee wanted, which others are not permitted to do at Government expence. But the health of Captain Cook's crew is not a ſolitary fact. The Intrepid, a ſhip of 64 guns, with a complement of 500 men, in Lord Rodney's fleet laſt war, did not loſe a man but what died of wounds, for the ſpace of two years and a half. This ſhip was in a very ſickly ſtate when

when Captain Molloy took the command of her; but by the complete mode of diſcipline, and attention to the cleanlineſs of the crew and ſhip, which he eſtabliſhed, health was preſerved in a climate, reputed to be unwholeſome; and that too, when expoſed to the hardſhips, which follow a ſtate of frequent or conſtant preparation for action.

Every officer who knows his duty, will be as cautious as ſervice will admit of, in expoſing his ſhip's company to either cold or rain.

The cuſtom of dividing every ſhip's company into diviſions and ſquads, under the inſpection of lieutenants and midſhipmen, has been productive of the very beſt conſequences. A book with every article of their cloathing, in diſtinct columns is kept by the officers who ſuperintend the different diviſions: theſe articles are occaſionally muſtered: the zeal which ſailors naturally have of attracting the

notice

notice of their commanders is excited and preſerved; they grow emulous to appear clean, and ſpend their money on neceſſaries, that would otherwiſe be ſquandered to bad purpoſes; and on the whole it prevents them from ſelling or otherwiſe deſtroying any part of their dreſs, or ſtealing clothes from one another. By theſe means the articles of dreſs are multiplied; and in caſe of cold or wet weather, they have always a ſhift or two to put on, while their damp clothes have time to dry, till wanted. The crew of a guard ſhip, when muſtered in a Sunday morning for church, exhibits as much good order and cleanlineſs, as the beſt diſciplined regiment in his Majeſty's ſervice. It is, therefore, to be hoped, that every improvement in this part of regulating a ſhip's company may become as general as poſſible, for a healthy fleet will certainly be the effects of it.

When

When wind ſails are uſed for cooling a ſhip below, or even throwing in freſh air, care ought to be taken that a free paſſage is left between the foot of every ſail, that a freſh current may be drawn from the one end to the other, which is the only way to purify the intermediate ſpace.

With regard to indolence and low ſpirits, which ſo powerfully and ſucceſsfully operate, in the production of Scurvy, they are, perhaps, to be eaſier cured in a ſhip, by the attention of an officer than ſurgeon. If any perſon's duty calls him to ſtudy the character or diſpoſitions, and an intimate acquaintance with the human mind; it is an officer, who has the command of a ſhip, or a regiment, a fleet, or an army. It is the grand point on which all military evolutions move. It is the ſecret, which to know, is to execute every piece of ſervice, with addreſs, reſolution, certainty, and ſucceſs. This diſcernment of cha-

racter peculiarly fits the commander to become the father of his ſhip's company. The way that ſuch a man diſpenſes his orders makes it a luxury to obey them. In the hour of danger, or ſeaſon of diſeaſe, it will awaken ſympathy for diſtreſs, as an inſeparable attendant of a noble mind; for the health of a ſailor will always intereſt his commander, if he poſſeſſes ſenſibility or goodneſs of heart. But to apply this reaſoning to our preſent ſubject: that indolent diſpoſition, and brooding over their own feelings, common to a number of men in the King's ſervice, is often miſconceived and imputed to very unworthy cauſes. I have generally found it owing to misfortunes liable to every ſtation in life; but particularly to a ſeaman. His country has taken the advantage of his ſituation, and his ſervice is rendered an indiſpenſible duty for the ſafety of its commerce and territory. It is only, therefore, mild treatment, that can reconcile an impreſſed

ſailor

ſailor with his fate; and if he is ſo unfortunate as not to overcome it, ſome fatal diſeaſe as Scurvy will be the conſequence. Among people of this deſcription it firſt makes its appearance. But if the ſhip is deſtined to a foreign ſtation, where he may be expoſed to unwholeſome tropical countries, he will be the firſt to ſuffer from remittent fevers, or dyſenteries. Low ſpirits are found every where to prediſpoſe the body moſt effectually to all kinds of contagion, ſuch as putrid fevers; ſo that cheerful ſpirits, or the active paſſions, when expoſed to infection, are the beſt preſervatives of health. An officer, therefore, cannot too minutely ſtudy the genius and temper of the people he is to command; but the good effects of it, and the ſatisfaction he will experience, will more than repay his aſſiduity as a man and an officer.

Having juſt hinted above at the fevers of tropical countries, I ſhall not long digreſs by

what I have now to ſay. Theſe fevers are produced by marſh effluvia, and one of the beſt things to guard againſt them, is flannel wore next the ſkin. It ſounds rather uncouth to wear flannel next the ſkin in a hot country, but the beſt effects may be expected from it. The ſurface of our bodies in all fevers, is ſo intimately connected with the internal parts by ſympathy, and the general ſtate of the ſyſtem from diſeaſe, that however the fact may be explained, the prevention and cure very much depend upon keeping the veſſels or pores of the ſkin in a perſpiring ſtate. I am not prepoſſeſſed in favour of this method of prevention, from any predilection for Doctor Cullen's Theory of Fever; but from having obſerved ſome ſailors who wore their flannel ſhirts and thick woollen trowſers, eſcape the ague and dyſentery, when others who wore check and linen ſuffered from theſe diſeaſes, though all were alike expoſed, on ſhore in wooding and watering the ſhip.

Thus

Thus far we have ſpoke of the prediſpo-nent cauſes of Scurvy.—We truſt that it has been ſufficiently proved from the beſt autho-rities in the preceding pages of this Work, that the moſt effectual means of counteracting a a ſea diet, will be to increaſe the vegetable part, and to bring that, as nearly as circum-ſtances and ſituations will admit of, to the recent ſtate.

For the Prevention of Scurvy, the Britiſh Navy, is at preſent ſupplied with Sour Krout, Elixir of Vitriol, Malt and Eſſence of Wort. Each of theſe ſhall be conſidered ſeparately.

Sour Krout was recommended by Doctor Lind after the faſhion of the Dutch Navy. It is a preparation of yellow cabbage cut in the month of November. The ſtalks in the heart being removed, the leaves are cut into thin ſlices with a large knife; which are to be ſtrewed

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in a caſk in layers, and then covered with ſalt. This being done, the whole is to be well preſſed for ſome time; a degree of fermentation takes place in a few days, and the compoſition becomes ſour to the taſte; an offenſive liquor flows from it during the proceſs, which muſt be carefully ſeparated. It is then to be preſerved in very cloſe caſks. When uſed, it is the general practice to waſh it, which carries off the ſalt, and leaves the clean leaf of the plant, of a taſte ſomewhat acid. When Lord Rodney ſailed to the Weſt Indies, by the advice of Sir Charles Douglas, (who, I believe, was well acquainted with the method the Dutch uſe it) he gave orders, that the cooks ſhould not waſh it, but boil it with the peaſe as it came from the caſk. I cannot, however, deem this any advantage in dreſſing ſour krout. Before purified by waſhing, it emits a flavor extremely putrid and diſagreeable; a proof that it has advanced very conſiderably

ſiderably towards the putrefactive fermentation. Doctor Lind ſays, after the cabbages are waſhed, "their virtue is the ſame as if "taken freſh out of the garden." That the effects of ſour krout have not been equal to the freſh vegetable is now pretty generally admitted: for how can any vegetable preſerved in this manner retain the virtues of its recent ſtate? The ſour taſte ſhews, that it has fermented, and the ſtink evidently proves the ſtrong diſpoſition to putrefaction, which even the great quantity of ſalt is unable to prevent. On the whole it appears to me, from both reaſoning and experience on the ſubject, that it is not worth the expence which it has coſt Government; its virtues as an antiſcorbutic, are very trifling, and I apprehend it might be advantageouſly laid aſide, for ſome other preparations to be mentioned hereafter.

The

The *Elixir of Vitriol*, was, I believe, firſt introduced to the navy by the late Doctor Huxham, of Plymouth. It is uſual for ſurgeons ſtill to demand it, but not from any view of its being either capable of preventing or curing the Scurvy. When diluted powerfully with water it is commonly uſed as a gargle to the gums and mouth; but in this way it is a mere *placebo*. The ſulphur which is the baſe of this acid, has ſo ſtrong an attraction for the oxygene, that it is incapable of being acted upon, by the powers of digeſtion and aſſimilation, or converted into animal fluids; hence it paſſes unchanged, through the body without exerting any effects on the blood.

The *Infuſion of Malt*, and the *Eſſence of Wort*, or more properly the *Extract of Malt*, were firſt ſupplied to his Majeſty's ſhips, from the recommendation of Doctor M'Bride. Their

ſuppoſed

ſuppoſed efficacy in curing the Scurvy was held forth in his doctrine and experiments on fixed air. About that time Doctor Black had publiſhed his celebrated Experiments on Magneſia and Quicklime. It was there, that modeſt philoſopher diſcovered the wonderful agency of the elaſtic fluid, fixed air in the operations of nature and art. He found that its preſence rendered lime and the alkalis mild, and that their cauſticity was owing to its eſcape. Theſe diſcoveries gave birth to a new æra in chemiſtry; and Doctor M'Bride, delighted with the ſubject, determined to apply the doctrine of this cementing principle, as he called it, to the cauſe and cure of diſeaſes. He, therefore, conſidered the want of this principle, to be the cauſe of putrefaction in the human fluids; and that by reſtoring it to the blood, the diſeaſes ariſing from a putrid diatheſis would be prevented and cured. A quantity of fixed air he knew was always generated during the vinous fermentation, ſo that by throwing ſub-

ſtances into the ſtomach capable of this proceſs, he thought that he could reſtore the bond of union, and reſiſt the putrid tendency of the blood. Few doctrines in medicine appeared more plauſible, and it was very univerſally ſupported. Beſides the experiments, inſtituted on purpoſe by Doctor M'Bride, it agreed with thoſe of Sir John Pringle, and the popular opinion of antiſceptics at that time; ſo that nothing remained to eſtabliſh its credit, for the cure of Scurvy, but a trial in the living ſubject. This was accordingly done; and the ſurgeons of the different ſhips where it was tried, gave ſo favourable an account of its efficacy, that the Lord Commiſſioners of Admiralty from that period to the preſent day, have ordered it as a part of naval victualling. Without at all ſaying any thing of the putrefaction of the fluids, a doctrine that I have long ago relinquiſhed, as not to be defended, the fundamental part of Doctor M'Bride's opinions totters on its baſe, from the accumulation

mulation of knowledge, and the extent of experiment which chemiſtry has gained ſince that time.

The Malt which he ſo warmly recommended as abounding with fixed air, has been lately more accurately analyzed. Barley, by being malted, acquires a ſaccharine quality, a quality without which the vinous fermentation cannot take place. Upon the affuſion of hot water this ſugar is extracted from the malt, with a mucilaginous ſubſtance peculiar to the barley; ſo that wort, or the infuſion of malt, differs very little from melaſſes diſſolved in an equal quantity of water. By adding a ferment to the one, you acquire *Sp. frumenti* or whiſky: and from the melaſſes you procure rum. When whiſky and rum are rectified by repeated diſtillations, you get pure Sp. of wine, or *alcohol*, as it was called by the Arabians, which is the radical ſpirit of all fermented liquors.

But let us inquire how fixed air is generated during the ſpiritous fermentation. Beſides a ſaccharine mucilage, a degree of fluidity, a heat from 55° to 65° of Farenheit, and free acceſs of the air, are required in the operation. The fluid is decompoſed in the proceſs; its oxygenous part combines with the carbonaceous matter of the ſugar, and forms carbonic acid, which is the fixed air we are ſpeaking of; the hydrogene, the other principle of the water, uniting with the oil of the ſaccharine body, conſtitutes the inflammable ſpirit or alcohol. How ſuch a proceſs as this could be conducted in the human ſtomach, would be difficult to explain; the bare mention of it is ſufficient for its refutation. Wort may be drank with as little inconvenience as water, making allowance for a purgative effect from the ſugar: but it is very different if a ferment has been added to it, and the fermentation not completed before the wort is taken into the body: it then excites a multitude of diſ-

orders;

orders; ſuch as diſtention and flatulency of the ſtomach and bowels; hence borborrygmi from theſe, ſevere gripes, purging, and teneſmus. All theſe ſymptoms we experience from new ale, imperfectly fermented, cyder, perry, wine, &c. The ſimple wort paſſes eaſily through the body, undergoes no decompoſition in the ſtomach, and cannot give out fixed air to the blood, till it goes through a regular ſpiritous fermentation. The ſame kind of air generated by the fermentation of all freſh vegetable ſubſtances is to be accounted for in the ſame manner; and the very proceſs neceſſary for its production, abundantly refutes the ſuppoſition, that this is the principle which they reſtore to the body for the cure of Scurvy.

Although I have no idea of impeaching the veracity of thoſe gentlemen who eſtabliſhed the credit of the malt preparations; yet I muſt beg leave to obſerve, that in my own practice I have not ſeen it attended with any good

good effects. It may be nouriſhing from the ſugar it contains; but there are certainly teſtimonies ſufficient on record to expunge it from the liſt of articles that can cure this diſtemper. Doctor Lind ſpeaks coldly of it, as a very nouriſhing liquor, well adapted for ſcorbutic patients;* but not one cure out of 130 men to whom it was given.—The Theory founded by Doctor M'Bride, brought into repute the fixed air to be given in other forms and preparations.

The *Carbonic Acid* of the New Nomenclature, was known before any of the other elaſtic fluids. It has received names from the various bodies it is combined with. Doctor Black called it fixed air. The Swediſh chemiſts found it to poſſeſs the preperties of acids, and as abounding in the atmoſphere, they gave

* Page 539, vid. note.

it

it the name of aërial acid. It is found in chalk, and called the chalky acid; and laſtly, from its being compoſed of carbonaceous matter, and the acidifying principle or oxygene, it is called the Carbonic Acid, by Meſſrs. Lavoſier, Morveau, &c. Doctor Dobſon wrote a Commentary expreſsly on the medical effects of fixed air, and he ſpeaks of ſome ſucceſful ſcorbutic caſes, from its uſe in the Liverpool Infirmary. I am apt to believe that the uſe of freſh vegetables was overlooked at the time of theſe cures, as well as in ſome others related by authors. The theory that gave it birth is now done away; but the ſupporters of another proximate cauſe, relying upon its efficacy, and the teſtimony of thoſe phyſicians who vouch for it, aſcribe its antiſcorbutic effects to a ſtimulant quality. This ſtimulating quality we obſerve from a momentary intoxication it occaſions when taken; but it is ſo tranſitory, that it can have little effect; and it would be too fanciful to ſuppoſe that it could ever re-

ſtore

ſtore to the body, what has been abſtracted by deficient nouriſhment. But in applying it to our theory of Scurvy; as being an acid, and compounded of a certain baſe, and vital air, ſomething might have been expected from it. The diſappointment, however, is to be accounted for in this manner. Of all known bodies, carbonaceous matter appears to have the ſtrongeſt attraction for vital air, hence their decompoſition in the carbonic acid is found to be the moſt difficult. Thus like many other acids it cannot be acted upon by the animal proceſs, although it may join itſelf with other ſubſtances before it paſſes through the body.—So much for this pretended antiſcorbutic.*

Pure

* Mr. Skinner, an ingenious Navy Surgeon, I have been told, has invented an inſtrument for giving the citric and other acids, and alkaline ſalts, in the ſtate of effervescence. He had ſuſpected that the ſtomach

Pure Water may be very juſtly reckoned a preventor of Scurvy, and to preſerve it in that ſtate, a valuable acquiſition with ſalted proviſions at ſea. Water does not ſeem to be decompoſed in the body, at leaſt, there are no experiments to confirm it; for though all the humours owe their fluidity to the water they contain, yet it can be ſeparated from all of them without any decompoſition of its conſtituent principles. The greateſt quantity, however, is thrown out by urine and perſpiration, in which are diſſolved various ſalts, elaborated during the proceſs of aſſimilation. A larger ſupply of this menſtruum is, therefore, more neceſſary at one time than another; for

much was a *vacuum*, and that the carbonic acid was not diſloged from the alkali, from the patient perceiving no uneaſineſs, ſuch as diſtention, ructations, &c. But had the human ſtomach been a *vacuum*, it would not have prevented the acid from combining with the alkali, for the acceſs of air is not neceſſary to their reciprocal attraction: and with regard to the patient feeling no uneaſineſs, it could ſcarce be expected that any diſtention of the gaſtric region could take place, from the ſmall quantity of carbonic acid, ſet free from any proportion of alkali that has ever been exhibited.

inſtance, where any foreign ſubſtance is taken into the body, as marine ſalt with ſea diet; a deſire for liquids immediately follows, which continues till a quantity has been ſupplied, fully to anſwer the purpoſes of nature. Putrid water has been always reckoned among the cauſes of that diſeaſe of which we are treating; but that has, perhaps, originated more from its offenſive ſmell than any bad quality it had acquired. Water of itſelf is incapable of undergoing any fermentation whatever. When confined in wooden caſks or veſſels, and not expoſed by agitation to the influence of the air, it ſoon emits a diſagreeable flavor. The agitation of water, therefore, is always neceſſary to preſerve it pure if it comes near any ſubſtance that can aſſiſt the ſeparation of its principles. In glaſs bottles it may be preſerved ſweet for a length of time; but in new caſks, it ſpoils very quickly, owing, no doubt, to the unſeaſoned wood, abounding more with the carbonaceous matter than old ones. The ſtink-

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ing ſmell is, therefore, produced by the eſcape of the hydrogenous gas, or inflammable air, while the vital air or oxygene which it has left joins itſelf to the carbone of the wood, and forms the carbonic acid or fixed air found on theſe occaſions.—We ſhall now apply this reaſoning to the means of reſtoring its ſweetneſs.

Many very oppoſite ſubſtances have been recommended at different times to purify water. That water is pureſt which upon analyſis, is found to contain no foreign body; but conſiſts of only the due proportion of the two principles which compoſe it. This ſeems the reaſon why river water is not only more fit for domeſtic purpoſes than ſpring water, but can be preſerved ſweet for a longer time. The agitation which it undergoes in its courſe, and expoſure to the action of the air, ſeem to precipitate many of theſe unpleaſant qualities it may have imbibed in its paſſage through dif-

ferent ſtrata. Thus the Thames water is preferred to others for a long voyage; but its ſuperior excellence is owing to long expoſure to the air, by the length of its courſe, and not to any pretended fermentation which is ſaid to take place.

How quicklime came to be uſed at firſt for purifying water, I am at a loſs to determine, unleſs it was from its attraction for fixed air which is generated during the decompoſition of the fluid in the caſks. We have attempted to explain the formation of this kind of air in wooden caſks, on the principles of the Pneumatic Theory, which, the more it is extended, gains ſtability by multiplying facts. But quicklime abſorbing or rather attracting the fixed air, does not ſweeten the water. Had this air alone rendered the water diſagreeable, its taſte would have been acidulous; but the taſte of water in this ſituation is indiſcribable; its ſmell comes near to rotten eggs. But an acidulous taſte communicated to water by other acids,

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as the ſulphuric, tartareous, &c. does not correct the ſmell.

Mr. Oſbridge a lieutenant in the navy, has contrived what philoſophers long ſought after in vain, an eaſy and expeditious method of ſweetening water, by a very ſimple machine. The conſtruction of the inſtrument as being common needs not be deſcribed. Without knowing or reaſoning any thing on the principles of water, his ſagacity taught him, that by expoſing it to the influence of atmoſpheric air, when putrid it would become ſweet: the operation, however, might be much ſhortened, by contriving the machine ſo, that a current of air could paſs right through it. The water thus expoſed by agitation, to the action of the air, has its hydrogene, from which the diſagreeable flavour ariſes, gradually diſſipated and carried off; or perhaps the ſuperabundant

bundant quantity of it, attracts oxygene from the air, and again compoſes water. *

Boiling alſo reſtores the ſweetneſs of ſtinking water, and is to be explained on the ſame principles. The hydrogene, a highly volatile elaſtic

* Duke, Portſmouth Harbour, Jan. 12, 1792.

SIR,

Having juſt heard of the Society's propoſed premium of a gold medal, or fifty pounds, for the beſt account, verified by ſatisfactory trials of an efficacious method of preſerving freſh water ſweet during long voyages, at a time that I had turned my thoughts to the ſubject, in finiſhing my Obſervations on Scurvy; I am, therefore, induced to offer you a few remarks on this important inquiry.

It would be endleſs for me to recount the various conjectures of philoſophers, and the numerous experiments of chemiſts, that are to be met with in books on this inveſtigation. Suffice it to ſay, that till lately, their labours have been fruitleſs. The ſubject has now aſſumed a new appearance; and where the famous Lavoſier and his learned aſſociates have left off, the preſent inquiry ought to begin.

If it has been proved, as I apprehend it is, as clearly as any chemical fact whatever, that water is no longer to be conſidered as a ſimple elementary body, but a compound of two kinds of air, viz. vital, and inflammable airs, as commonly expreſſed: this compoſition, and their decompoſition, which depend upon the laws of chemical attraction, certainly point out to us very novel ideas for preſerving it pure and ſweet

elaſtic fluid, is immediately ſeparated by the heat, ſublimed and carried off into the atmoſphere. The water is then left pure, and without any putrid or diſagreeable ſmell whatever; but as heat alſo expells the common air it is not equal to the other method.

The

ſweet in long voyages. It is well known, that glaſs veſſels when corked cloſe, or earthen jars well glazed, and ſtopt, preſerve water for any length of time. Now what does this depend upon? The water is incapable of acting upon theſe ſubſtances; it finds no ſubſtance that has a ſtronger attraction for either of the gaſſes of which it is compounded, than they have for one another. In this manner it remains ſweet, and would remain ſo for ever. But if it is put into a wooden caſk, and particularly a new one, very different phenomena takes place. Water is incapable itſelf, of fermentation in any ſituation; but the changes which take place in the fluid, in a caſk at ſea, are to be eaſily explained.

On opening the bung of a caſk where the water ſtinks, a volatile elaſtic vapour is immediately ſet at liberty: a putrid ſmell is perceived, and if a lighted candle comes in contact with it, it takes fire. This elaſtic vapour is nothing elſe but inflammable air, or the hydrogenous gas, of the New Nomenclature. The manner of its diſengagement is, ſhortly, thus: the wood poſſeſſes a large proportion of carbonaceous matter, which attracts the oxygene of the water, and leaves the hydrogene free. Fixed air or carbonic acid is, therefore, conſtantly generated in a caſk of ſtinking water; this is proved by adding a little quick-

lime,

The manner of purifying water naturally leads us to the diſtillation of ſalt water at ſea. Mr. Irvine obtained from Government a premium of 5,000l. for the invention, though Doctor Lind, on the beſt grounds claimed it as his. Whoever was the contriver of the beſt and eaſieſt method

lime, which combines with the acid, and it is thus reduced to its original ſtate, limeſtone.

Now this deſcription ſufficiently ſhows the futility of former reaſoning on the ſubject; and from it too, we learn that no ſubſtance added to the water, at leaſt, any that is yet known, can either preſerve or recover it. The only method yet invented is by expoſing it to the atmoſphere, as by the machine of Lieutenant Oſbridge: this proceſs alſo confirms our explanation; for the hydrogene is either diſſipated or attracts oxygene from the ſurrounding air to reſtore ſweetneſs to the water.

Since we find that an old caſk preſerves water better than a new one, it is more than probable, that what is commonly called *ſeaſoning* is nothing more than exhauſting the principle of the wood, which favours the decompoſition: and I am apt to believe, that by imitating this proceſs there is a poſſibility of rendering wood, equally fit for preſerving the fluid ſweet, as porcelain or earthen ware.

For this purpoſe I would recommend the ſtaves of the caſks when ready to be put together, to be ſteeped for a length of time in a pond filled with water; this ought to be allowed to ſtagnate, ſo as to favour the

method of conducting the diſtillation on ſhip board, with the leaſt expence of fuel, was certainly the man moſt entitled to the bounty of Government. Neither of theſe gentlemen had any merit or claim, by diſcovering that freſh water could be procured from ſalt water; it was

the decompoſition of the water. The ſooner, therefore, the pool becomes putrid, and the longer time that the wood is immerſed in it, the more perfect will be the *ſeaſoning*.

Had I undertaken experiments of this kind as a candidate for the Prize Medal of the Society, you will obſerve, from the nature of the ſubject, they could not be fully decided in the time you have appointed. I would beg leave to ſuggeſt it to the conſideration of thoſe Gentlemen who conduct the chemical department; whether, from the late rapid progreſs of experimental philoſophy, there would not be ſome propriety in changing the ſtatement of the queſtion. From the experience I have had of a ſea life, I cannot heſitate a moment in declaring this to be the moſt eligible method. There were many inſtances during the late war, where ſhips on foreign ſtations, by having well ſeaſoned caſks, and having never been under the neceſſity of unſtowing their holds, found the water pure and ſweet at the end of four years, as when they left Spithead. But unſeaſoned new caſks will ſpoil the water in ten days or a fortnight: oak caſks have alſo, from the hardneſs of the wood, been preferred to all others.

If what has been ſaid is at all conſiſtent with matter of fact, from the repreſentation of your moſt reſpectable Society, I have no doubt

was well known to chemiſts before them, that ſea water was the pure fluid, in which were diſſolved ſalts of various kinds, but particularly marine ſalt. The apparatus now in uſe in his Majeſty's ſhips for this purpoſe, is fitted to the tops of the boilers, ſo that the proceſs can be conducted in one boiler, while the victuals are preparing in the other, by which means coals and wood are ſaved. Every officer ought to be made acquainted, that only a certain proportion of pure water can be obtained from a given quantity of the ſalt water. What flows firſt from the ſtill, as being the moſt volatile, is the pureſt; ſo that it will be pro-

but the Commiſſioners for victualling his Majeſty's Navy, might be perſuaded to order ſome experiments to be made for ſeaſoning the ſlaves in the manner directed above: ſuch a repreſentation, I ſuſpect would be little attended to from an individual.

I am, Sir,

Your moſt obedient, and humble ſervant,

T. TROTTER.

To the Secretary of the Society
for Arts, Manufactures, &c.
Adelphi, London.

per

per to have only a ſlow fire. The water as it comes over ought to be frequently taſted, and the moment that any thing diſagreeable is perceived, the diſtillation muſt go no farther. The whole quantity of diſtilled fluid may now be paſſed through Oſbridge's machine, which will rectify any unpleaſant flavour, by impregnating it with common air. If conducted in this manner, the water will be found pure and wholeſome as any that comes freſh from the fountain. I would recommend it to every Captain in the Navy, when he ſails for a long cruize, or when he ſuſpects a long paſſage, not to wait for this expedient till his ſhip's company may be in want of water, but to begin the operation as ſoon as he goes to ſea. By this timely precaution, he will have provided a ſtock for any emergency; the water will have the chance of being of a better quality when he is not under the neceſſity of puſhing the diſtillation too far, which might impregnate the whole with ſome diſagreeable ſubſtance.

We come now to mention the proviſions uſed at ſea, and what alterations we propoſe, ſhall be perfectly compatible with the ſituation, avoiding all refinements whatever. We have before given it as our opinion that the ſalted meat uſed in the navy at preſent, is prepared in the greateſt poſſible perfection, and reflects the higheſt credit on that Board which ſuperintends this department of the public ſervice. The allowance of butter and cheeſe that is ſerved out in King's ſhips is ſo ſmall a proportion to the other parts of diet, that it ſcarce deſerves notice. The vegetable part of the proviſion, conſiſts of biſcuit, flour, and raiſins, to be made into puddings; oatmeal, of which bargou or a thick gruel is made for breakfaſt; and peaſe, which are boiled as ſoup for dinner. Every meſs at ſea is occaſionally ſerved with vinegar, and ſour krout has been more carefully ſupplied of late, as alſo melaſſes, which are mixed with the bargou for breakfaſt. The allowance of ſmall beer is, perhaps, more than what moſt men conſume in

twenty-

twenty-four hours; it is generally of an excellent quality, and when ſerved otherwiſe to the people, it muſt be from a want of attention in their officers. The beer ſeldom laſts more than a fortnight at ſea, and on foreign ſtations it has never been ſupplied at all; ſpirits and water, which is grog, or wine have therefore been ſubſtituted, neither of which are to be compared to this ſalutary beverage as an anti-ſcorbutic.

While a ſhip is in port and freſh beef allowed, every officer ought to be attentive to the quantity of greens, that are boiled among the ſoup. Small as this allowance is, it is often ſhamefully perverted to other purpoſes. Government would do well, at leaſt thrice in a week, to allow a much larger proportion of vegetables, conſiſting of all theſe in ſeaſon to be mixed with the freſh beef broth. It is in this manner only that a ſhip returning from a cruize or long voyage can beſt recruit a ſickly crew; and recover

ver them in a very ſhort time for the emergencies of ſervice.

It is much to be wiſhed, that it were a general practice in the navy, when a ſhip goes to ſea, to diminiſh the allowance of ſalted meat, and, if neceſſary, increaſe the other articles of diet. This method can be defended on the beſt foundation; as the beer laſts generally ſo ſhort a time at ſea, and the water not always plenty; it is in ſome meaſure making up for both; for the leſs ſalted meat made uſe of, a ſmaller proportion of liquids will be wanted to dilute them in the ſtomach, and carry the ſalt out of the body. This practice is confirmed from experience, and does not claſh with any Theory on Scurvy.

On the Jamaica ſtation ſome time laſt war the Captains of ſeveral ſhips, ordered their purſers to furniſh the men with cocoa and ſugar, in lieu of oatmeal, butter, and cheeſe. I have not been

been able to learn the names of theſe officers who thus diſtinguiſhed themſelves by their judgment and humanity; their example, however, has made it general in the Weſt Indies, and it has now received the ſanction of Government. The oatmeal, butter, and cheeſe, are three articles very liable to ſpoil in hot countries, and cocoa has been wiſely ſubſtituted in their room. A breakfaſt is the moſt deficient meal in a ſeaman's diet; and if this alteration has been attended with ſo many good conſequences abroad, why not extend it to the home ſtations? It is in a cold country where it would be ſingularly beneficial: what a comfortable meal would a cup of warm cocoa or chocolate be to a ſailor in a winter cruize in the channel or north ſea, on coming from a wet deck in a rainy morning watch! This meſs is, beſides, extremely nouriſhing. Cocoa abounds with a vegetable oil and mucilage, approaching nearly to an animal nature; and is, upon the whole, one

of

of the moſt valuable additions to a ſea diet that has ever been invented.*

It has been frequently propoſed to Government to ſupply ſhips abroad with porter; in ſupport of which meaſure, ſtrong evidence is produced of its antiſcorbutic qualities.† I have no doubt of porter being a valuable antiſcorbutic, or rather a preventive of Scurvy; but I am afraid that a general ſupply to the navy is ſcarcely practicable. Porter only differs from ſtrong ale, by adding a quantity of liquorice juice, and ſome narcotic ſubſtances, ſuch as the *coculus indicus*, &c. What I apprehend would be of equal advantage is, that the beer which is to be carried to ſea, may be made one half ſtronger, and only two quarts allowed in the day inſtead of the gallon, as at preſent. Moſt ſhips would be able to take

* It ought to be remembered that ſeamen in general are very averſe to the uſe of bargou, even when ſweetened with melaſſes.

† Doctor Blane.

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a ſupply at a time, equal to ſix or eight weeks expenditure: being ſtronger than the common ſmall beer, it could be kept much longer, and as containing an equal proportion of ſaccharine matter would be equally antiſcorbutic. This ſtrong beer as being preferable to malt in an unfermented ſtate, ſuch as the eſſence of wort, would alſo in a great meaſure ſuperſede the uſe of wine and ſpiritous liquors; but ſome political reaſons beſides thoſe which regard health juſtify this propoſal; the malt, as being a production of the country, ought rather to be prefered, for the conſumption in time of war would be immenſe.

When ſpeaking on the proximate cauſe, I had occaſion to mention, that wine poſſeſſes little of that quality, which we value in the cure of Scurvy, although it abounds with an acid. I have ſeen it taken with much reluctance; but even when it has been duly perſiſted in, and in large quantities too, it neither

ſeemed to cure or retard the progreſs of the diſeaſe. Low ſpirits, deſpondency, and apprehenſion about their ſafety, are almoſt conſtant attendants on Scurvy; yet when they have approached the extreme degree, wine is received with indifference. Very contrary to this is the appetite for wine in Typhus; the deſire for it there, is marked by the moſt anxious ſatisfaction on receiving it, and it has been obſerved, that when the indication of wine was doubtful to the phyſician, it was the beſt practice to leave it to the cravings of the patient.

With reſpect to diluted ſpirits or grog, inſtead of wine or beer, it is certainly an unſalutary ſubſtitute. The uſe of it ought to be checked by every prudent precaution. Whatever exhilirating effects and pleaſing ſenſations it may excite, it is, of all ſtimulants, perhaps, the moſt dangerous to indulge in. Beer and wine, as abounding with ſugar and mucilage are nouriſhing and healthful; but diluted

ſpirits

ſpirits have a very contrary tendency. Grog exhauſts and debilitates the conſtitution; as communicating a more ſudden ſtimulus to the ſtomach it is, of all liquors, the moſt likely to induce a habit of dram drinking, with all its horrid conſequences.* A quantity of ſugar ought, therefore, to be always mixed with the ſpirits and water; orange, lime, or lemon juice where they can be procured, which make an artificial wine, may be added, as rendering the compoſition ſtill more ſalutary and antiſcorbutic.

As correctors of ſalted proviſions, and the beſt condiments for animal food, I would recommend pickles of red cabbages, cucumbers, kidney beans, onions, &c. prepared in the ſame manner as for common uſe at table. A proportion of theſe might be ſerved on the

* Vide the Author's Inaugural Diſſertation, De Ebrietate Ejuſque Effectibus in Corpus Humanum. Edit. Edin. 1788.

days that ſalt beef and pork are iſſued to the ſhip's company. I will not argue that theſe pickles will cure Scurvy or even prevent it on all occaſions; but certain I am that their effects will be ſuperior to the ſtinking preparation of yellow cabbage at preſent in uſe. They will keep for any length of time, as being pleaſant and grateful to the taſte, and needing no kind of cooking whatever, which is a very eſſential advantage at ſea, they cannot fail of being acceptable to ſeamen. It may be worth while to remark that theſe articles can be purchaſed for the ſame expence that Government generally pays for ſour krout. But to ſerve them alternately with the krout, would make both more beneficial, for I ſhould be very glad to ſee them introduced into the navy in any manner.

In thoſe ſtations abroad, but particularly in the Weſt Indies, where vegetables can be procured at an eaſy rate, ſuch as plantanes and yams,

yams, it would be a very good practice to allow them twice a week in lieu of bread when the ſhip is in harbour. It is difficult to preſerve bread from inſects in warm countries, and I know no better ſubſtitute for it than plantanes and yams. The fruits of the climate ought alſo to be frequently ſerved out to the ſeamen, both as amuſing them and for the preſervation of health. It ought to be remembered that their wages are never paid abroad, conſequently they have little chance of ſharing ſuch dainties: officers themſelves who have it in their power to procure theſe delicacies at their own tables, perhaps, think very little about their ſhip's company, though ſuch articles are highly eſſential to their welfare.

People recovering from fevers, or other diſeaſes, by which they have been much reduced, ought not to eat the common fare of the ſhip till tolerably recruited in health and ſtrength. The breakfaſt of cocoa which we have recommended,

mended, would be a luxurious meal at ſea to the convaleſcent ſailor; with this and the portable ſoup, and a pint of wholeſome port wine, which is the allowance when the beer is expended, they could not fail to recover. A very comfortable ſupper may alſo be procured by ſlightly fermenting oatmeal, and making ſlummery of it. This was a conſtant meſs to the ſick and convaleſcents in the Berwick, when commanded by Captain Keith Stewart, now Rear Admiral of the Blue. When properly prepared and a little wine and ſugar added, there cannot be a more palatable ſea meal. Other articles for this purpoſe, ſuch as rice, currants, barley, and ſugar, are ſupplied among the ſurgeons neceſſaries; but the quantity allowed of each is ſo ſmall, that in ſickly ſtates of a ſhip they are by no means ſufficient.

We are now to ſpeak to the cure of Scurvy. From what we ourſelves have ſeen of the diſeaſe, or learned from the writings of authors,

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we believe that freſh eſculent vegetables of all kinds will cure it; but that thoſe fruits abounding with an acid, ſuch as the citric claſs, are more effectual than others. Moſt vegetables poſſeſs in their recent ſtate a portion of acid, though ſo ſmall as not always to be perceived, and in proportion as it abounds in them, and perceptible to our taſte, they have a ſuperior antiſcorbutic quality. The lemon, lime, ſhaddock, and orange, in the manner we have ſet them down, give out the citric acid in different degrees of purity. This genus of fruit has advantages above all others, for as it approaches to maturity, the acid is not altered for the worſe, but rather purer than before. The unripe gooſeberry has the citric and oxalic acids combined in its juice, and there can be no doubt but it is equally effectual as the lemon. I recommended this to be carried to ſea; and have ſince ſeen in a newſpaper, where a number of ſcorbutic ſailors, in an Eaſt Indiaman were cured in their paſſage outwards by ſome unripe

unripe gooſeberries that were preſerved for making tarts. The malic acid is pure in the apple juſt before it is ripe, but it has leſs afterwards. The laſt caſe of Scurvy which I treated was cured by apples.—This, with the recovery of the ſeamen in the Berwick, at Torbay, ſufficiently proves that apples are valuable antiſcorbutics.

The caſes in which I laſt adminiſtered the juice of lemons and oranges for the cure of Scurvy are worth narrating. Some time in November, 1789, eighty Iriſh convicts came from Newfoundland in company with the ſhips returning from that ſtation to England. Theſe convicts to the number of 130 or 140 had been ſhipped at Dublin ſome time before. The maſter of the veſſel in which they ſailed, had orders to land or diſpoſe of them, ſomewhere in the territories of the United States of America. Inſtead, however, of fulfilling his contract with Government, and obeying orders,

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he reſolved upon making the beſt bargain with his priſoners. Thoſe who had caſh paid it to him for their liberty; among the reſt was a noted Roman Catholic prieſt, who had been convicted of forgery. When he had ſtript them of all the money and clothes which they had, they were, men and women, turned on ſhore in the Iſland of Newfoundland. Here, with the little proviſion he had given them, they were to make the beſt of it. Some periſhed in the woods from hunger and fatigue, and others reached different ſettlements in the Iſland. The circumſtances of their ſituation ſoon reached Vice Admiral Milbank, then commander in chief on that ſtation, who ordered them to be collected and ſecured, and a ſhip fitted to carry them to England. They remained in Portſmouth harbour till the Deptford, a navy tranſport, was ordered to convey them to Dublin, under convoy of his Majeſty's ſloop Drake. The ſloop and tranſport went to ſea, and were obliged to put back to Cowes Road in diſtreſs

of weather, about the 20th of December. The maſter of the tranſport, at this time, complained to Captain Counteſs of the Drake, that the convicts were in a very unhealthy ſtate, and begged he would order his ſurgeon's mate to viſit them, the ſurgeon of the Drake being then abſent. The young gentleman had been a ſtranger to the diſeaſes of ſeamen, and immediately pronounced that the gaol fever had broke out among them. This opinion he conceived from the debilitated ſtate, the fetor about them, but particularly the large livid ſpots which appeared in different parts of their bodies, and the deſire which many of them expreſſed for acid fruits and vegetables. Captain Onſlow, then commanding at Portſmouth in the room of Vice Admiral Roddam, tranſmitted Captain Counteſs's report to the Lords Commiſſioners of Admiralty, who, by return of poſt, ordered two ſurgeons to ſurvey the convicts, and report their ſituation. The ſurgeon of the Magnificent with myſelf, was ordered on this buſineſs.

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The firſt man who made his appearance, plainly ſhewed that the diſeaſe was Scurvy; and when we came to inquire more particularly into their hiſtory, as related above, there could be little doubt that the complaint was general. From the time that they embarked at St. John's in the Iſland of Newfoundland till now, they had lived on ſhip's proviſions, without any freſh vegetables whatever, at the rate of two-thirds allowance. Never did I behold together ſo many wretched fellow creatures. Thoſe that were cloathed had not ſhifted for many months; but the greater part of them were naked, even without a ſhirt; a hammock tied round their ſhoulders by a rope yarn was their only ſhelter from the cold, and at the ſame time without a bed to lie upon. It ought to be remembered it was now the middle of winter, and the weather for ſome time before had been wet and boiſterous.

In our report to the commanding officer of the port, we recommended an immediate ſupply of recent vegetables, cloathing and bedding; all of which, much to the credit and humanity of the Admiralty Board, were granted, with a ſurgeon and what aſſiſtance he chuſed to call in to attend them.

Few of them were without ſome ſymptom of Scurvy, ſuch as ſpongy gums, livid ſpots on different parts, and contractions of the hams, &c. This laſt ſymptom has generally been accounted for from blood effuſed in the interſtices of the muſcles, or into the cellular texture. Such an explanation is, indeed, very mechanical, but it is not a good one. Had this rigidity and contraction been owing to pieces of coagulated blood, there muſt have been ſome perceptible ſwelling or diſtention of the parts; but none is to be obſerved: the thigh is ſhriveled and leſs in circumference than in an healthy

healthy ſtate; the tendinous fibres are alſo to be traced by their hardneſs, till they are gradually loſt in the belly of the muſcles. Beſides if that explanation could be admitted, we might with equal propriety ſay, that the Triſmus and Tetanus, which were met with among the black people, were produced by the ſame means, viz. lumps of cloated blood, diſtending the temporal, maſſeter, and other muſcles, which move the lower jaw upwards. And in Tetanus, how can it be ſuppoſed, that the whole muſcles of the body could be thrown into a rigid contraction, from any cauſe of this kind. Theſe conditions of the muſcular fibre are, certainly, much better explained from the diminiſhed nervous energy: it is this torper of the *vis vitæ*, which produces the *hebitudo animi*, and renders the mind as well as the body ſo little diſpoſed to be effected by the uſual ſtimuli; and is a ſtate of the nervous influence more peculiar to Scurvy than any other diſeaſe.*

* Doctor Blanc ſays, he diſſected ſome ſubjects, and found no *ecchymoſis*.

Bedding

Bedding and cloathing being immediately furniſhed to the convicts by their Lordſhips' orders, the cure of Scurvy was begun with lemons and oranges. At the ſame time they had beef and mutton broth, in which were boiled cabbages, onions, &c. In diſtributing the freſh fruit among them, the only rule that I went by, was to give moſt to thoſe who had the worſt ſymptoms of the diſeaſe. Their recovery, as is commonly remarked in the Scurvy, when plentifully ſerved with acid fruits, was aſtoniſhingly rapid; for on the eighteenth day of my attendance, they ſailed for Dublin, where they arrived in ten days after, in perfect health and ſpirits.

The great deſideratum in long ſea voyages is ſome preparation of the citric acid, that preſerves all its virtues for a length of time. Different forms have been tried for this purpoſe. The extract recommended ſo warmly by Doctor Lind, has been found by Captain Cook

Cook and others of little or no effect. It could ſcarcely indeed be expected that any preparation of this kind could retain the virtues of the recent fruit. It is not only the water that evaporates, but the acid is carried off with it, and the taſte of the remaining juice has, manifeſtly, leſs acidity than when it was ſqueezed from the lemon; its powers were not, therefore, concentrated by that proceſs. A much better method is to bottle up the juice immediately as it is ſqueezed and ſtrained. By letting it ſtand to clear, it is ſaid that the mucilage may be ſeparated, which is the cauſe of its acquiring a mouldineſs and diſagreeable taſte; But what we gain in one way by theſe means we loſe in another; for during the depuration and precipitation of the mucilage, a fermentation begins, which very materially alters the acidity of the juice, and deſtroys its antiſcorbutic qualities. If, therefore, the lemons are freſh, as they ought to be, with their rind hard and full of aroma,

the

the liquor may be corked up inſtantly, to preſerve it in perfection.

The beſt method of giving the lemon or orange juice, is to allow the patient to ſuck it from the fruit. With little trouble the entire lemon may be preſerved for the longeſt cruize in tight caſks; and this is, of all others, the ſureſt way of ſecuring the virtues of the citric acid.

But other methods of concentrating and preſerving the citric acid, have been lately practiſed by different chemiſts. The following proceſs for concentrating the acid juice of citrons, and rendering it unalterable, was publiſhed ſome time ago by Mr. Georgius, in the Acts of the Academy of Stockholm. He directs the juice to be kept for ſome time in the cellar, (I ſuppoſe where it may be cool, and not liable to fermentation) in inverted bottles, in order to ſeparate from

from it a part of the mucilage; and then to expose it to a cold, from 21° to 23° of Farenheit's thermometer. The aqueous part freezes, carrying with it, as it would appear, a portion of the mucilaginous matter; care must be taken as the ice forms to separate the liquid from it, and the congelation must be carried on till the ice becomes acid. The acid thus concentrated is reduced to about one eighth part of its original bulk.

This preparation has not yet been tried in practice for the cure of Scurvy, but there can be no doubts of its good effects. It is much to be wished that Government should patronize a trial of the acid concentrated in this manner; for when prepared as it ought to be, it will keep for ages.

The juice of lemons and limes has been often recommended by some of the oldest writers to be used externally to the swellings, rigid

limbs, and ulcers of Scorbutic patients. A ſurgeon in Lord Rodney's fleet laſt war, we are informed by Doctor Blane, found much benefit from it, applied to ſores in the form of a poultice. It was a common practice with the ſlaves in the Guineaman to waſh their ulcers with lime juice; but I never thought of attributing their ſpeedy cures to the external application, while they were uſing the fruit internally. This reminds me of a late French author, whoſe name I do not at preſent recollect; but writing on the doctrine of transfuſion, he was ſo much attached to his favourite ſubject, as to recommend the juice of lemons to be injected into a vein for the cure of Scurvy, becauſe it would be more effectual by being directly mixed with the blood, and not expoſed to the changes it might undergo by paſſing the proceſs of digeſtion. We have yet to learn, whether there is any topical application that can cure a ſcorbutic ulcer, where freſh vegetables cannot be procured. The ſtate and condition of theſe ſores are ſo

ſpeedily

ſpeedily altered after the uſe of the acid fruits, that it almoſt exceeds belief; hence we are apt to believe that external applications uſed at the ſame time have been of ſervice.

When a ſhip returns to port with a number of ſcorbutics, they ought by no means to be moved till they have been ſo much recruited on board, by refreſhments from the ſhore, that they can be ſent to an hoſpital without danger of expiring when they come to feel the external air. When the Berwick came to England, after the hurricane in October 1780, upwards of two hundred men were landed from her, bad of the Dyſentery and Scurvy. From the time of the hurricane till ſhe came to Spithead, no leſs than thirty of her beſt men died of theſe diſeaſes; five of the ſcorbutics periſh[illegible] the boats between the ſhip and the hoſpital. When this dreadful gale happened, by which the Thunderer went down, and the other ſhips totally diſmaſted, the crew of the Berwick were

remarkably healthy. There were, at this time, in the ſick liſt only two men; a ſervant of Captain Stewart's, who was confined of the flux from the day we left Jamaica, and a ſailor who had been tapped ſome time before for the dropſy. But the Flux and Scurvy ſoon made their appearance afterwards, and were probably very much accelerated by the fatigue which the men underwent, by the wet bedding, and proviſions, particularly the bread being damaged by the ſalt water during the tempeſt. In the Dyſentery I was, myſelf, a ſufferer; and owed my recovery very much to the liberal uſe of wine, for every article of medicine, excepting pulv. ipecac. and bark, were deſtroyed, with all our cloathing by the motion of the ſhip, which became violent, beyond deſcription after the loſs of the maſts. It ſeemed not a little ſurpriſing that the man who had the dropſy, and was emaciated almoſt to ſkin and bones, though ſleeping among the reſt of the ſick, yet he eſcaped both diſeaſes, and recovered perfect health

health afterwards at the hoſpital. It may be worth while to relate, that when I was ſeized with the Dyſentery, another gentleman who lived with me was taken ill at the ſame time. The coppery taſte common at the attack of this diſeaſe, was ſo remarkable at the commencement of the nauſea, that we formed the ſtrongeſt ſuſpicions of having taken poiſon in ſome pea-ſoup. We had immediate recourſe to an emetic; the other gentleman, by vomiting freely, was next day perfectly free of complaint, and eſcaped; while the emetic which I took had no effect whatever, and the conſequence was, that I was reduced to the laſt ſtate of debility by the diſeaſe. In the mouth of the channel we fell in with two frigates, who ſupplied us with a little opium: the effects of it were aſtoniſhing; it ſeemed with myſelf and others to produce an inſtant cure. This medicine has been often cruelly withheld in Dyſentery, from miſtaken notions of its proximate cauſe; but much practice ſince that time fully convinces

convinces me, that its effects in this diſeaſe, particularly when the *tormina* are ſevere, are greater than in almoſt any other complaint where we adminiſter it. After the inteſtines, therefore, have been well emptied, it ought to be given in large quantities, and duly perſiſted in throughout the courſe of the diſeaſe.

When ſervice requires a large fleet for a length of time to keep the ſea, it is much to be wiſhed, that there were veſſels appointed to ſupply the ſhips with freſh fruit and vegetables occaſionally. There are few ſtations where they could not be procured; a ſmall veſſel or ſloop of war going now and then to Liſbon would provide a channel fleet with theſe articles. Apples are ſeldom ſo ſcarce in Devonſhire, but they may be purchaſed at a moderate price, and would be very acceptable at ſea. But beſides fruits, all eſculent vegetables in ſeaſon ought to be ſent out to a cruizing ſquadron, by veſſels ſtationed for the purpoſe. Naval

ſervice,

ſervice, however urgent, ſeldom comes in oppoſition to theſe humane regulations. What a ſatisfaction muſt it be to every well wiſher of his country to ſee a fleet on which the ſafety of theſe kingdoms depends, returning to port with healthy crews; and how afflicting the contrary, where numbers are periſhing of this loathſome diſeaſe!

There are few or no ſymptoms in Scurvy, that require any particular treatment; for none can be alleviated without the general means of relief. Fomentations, the warm bath, &c. have been often tried for the rigid tendons, and hardneſs of the muſcles, but without effect; ſtimulant applications have been equally unſucceſsful. For the difficult breathing and tightneſs about the breaſt, bliſters, and the whole train of expectorants are inſufficient to relieve. Opium itſelf, our laſt and only refuge in other caſes of acute pain, affords no refreſhing ſleep or eaſe to the ſcorbutic ſufferer. We have heard much of

ſudorifics

ſudorifics opening the pores of the ſkin and ſoftening the ſurface; but this is trifling with the complaint. It is only the produce of freſh vegetation, that can adminiſter to him the reviving cordial; and a few lemons will do more in aſſuaging his anguiſh than the whole art of pharmacy.*

In curing this diſeaſe, however, every phyſician ought to have in view the ſtate of his patient when he was ſeized with the Scurvy. If the conſtitution was weakened by preceding illneſs, a diet of reſtorative food, with the uſe of wine, will be more beneficial than on other occaſions. Whatever ſymptoms of other complaints remain after thoſe of Scurvy diſappear, ought to be treated in the ſame manner as for the original diſeaſe to which they belong.

* Tranſports carrying troops abroad ought to be well provided with theſe articles.

In

In the year 1786, a dreadful Scurvy broke out among the Ruſſian ſailors then living on ſhore at Cronſtadt. Theſe people were kept remarkable naſty, badly cloathed, their lodgings very dirty, damp, and imperfectly aired. They had no particular hard duty, for the ſhips were laid up for the winter. Their diet conſiſted moſtly of a ſpecies of pudding, not made of the moſt wholeſome grain, ſalt fiſh, but not often fleſh meats, and no freſh vegetables of any kind. About the end of February, when they had lived in this manner for four months, the Scurvy made its appearance. To ſuch an alarming degree did it rage, that the Empreſs ſent her own phyſician to inquire into its cauſes, and give the directions neceſſary to check it progreſs. At that ſeaſon of the year, I apprehend no lemons or oranges could be procured in Cronſtadt; for the principal remedy was a berry found in theſe countries, very much reſembling our craneberry, and was, probably, nothing elſe. The diſeaſe,

however, continued to rage in ſome degree till the middle of ſummer, and it was not till pot herbs became very plentiful that it ceaſed altogether. This account was given me by Mr. Harris, now ſurgeon of the Aquilon; at that time a ſurgeon in her Imperial Majeſty's ſervice, who attended the ſailors at Cronſtadt.

Mr. Harris put into my hands Doctor Backeracht's Practical Diſſertation on the Scurvy for the uſe of the Surgeons in the Ruſſian Army and Navy.* After ſome general remarks on the diſeaſe, Doctor Backeracht gives us his opinion concerning the principal and other occaſional cauſes of Scurvy. Humidity, he ſays, is the principal prediſpoſing cauſe of Scurvy, that is the body being long expoſed to a damp and moiſt atmoſphere; but there muſt be other

* Diſſerrtation pratique ſur le Scorbut pour l'uſage des Chirurgiens de l'Armee et de la flotte Imperiale Ruſſe, traduite de l'allemand ſur l'original du Dr. Henri Backeracht, Conſeiller Actuel du college et Premier Medcin de la Flotte Imperiale.—Reval 1787.

ſecondary

ſecondary cauſes, he adds, concurring to give activity to the effects of humidity in order to produce the diſeaſe.

Theſe are the following:—1mo. A cold and long winter; 2do. proviſions of a bad quality; 3tio. hard labour and long continued; 4to. deficiency of cloathing; 5to. bad lodgings; 6to. the exceſs of ſpiritous liquors. In his account we find the prediſpoſing and occaſional cauſes very improperly confounded; and it is eaſily ſeen from whoſe authority Doctor Backeracht has been led to lay ſo much ſtreſs upon humidity. I have thought myſelf fully authorized by all I have read or ſeen of the diſeaſe in queſtion to draw this final concluſion, that it can only occur in ſituations where there is a *deficiency of freſh vegetable matter*. The Imperial Phyſician alſo tells us, that it is during the uſe of proviſions of a bad quality, without being joined with vegetables to correct them; "*ſuch* "*as freſh cabbage, acids, roots of any kind, as*

"*potatoes, &c.*" that Scurvy ariſes. Having aſcribed ſo much as he had done to the ſituation and climate of Ruſſia, he is greatly embarraſſed about its production in the mild climate of Cherſon, from whence a Colonel of the army had written to him, that his regiment was very much afflicted with Scurvy. This port, he ſays, is ſituated in a climate where the winter is neither long nor rigorous, for the cold is very moderate. In trying to reconcile ſeeming contradictions, it is unfortunate for a man to overlook the only circumſtance that can do it. Had Doctor Backeracht allowed due weight to the deficiency of freſh herbs or fruits, he could have been at no loſs in explaining the occurrence in any climate or ſituation.

What is delivered in this Work concerning the Prevention of Scurvy is very little applicable to the ſame purpoſe in our navy. Such ſcenes of filth and naſtineſs as deſcribed, are not to be found in any Britiſh man of war; and

and the diet of our ſeamen would be a feaſt to a Ruſſian ſailor.

In his treatment of the diſeaſe a multitude of Formulæ are given; and his indications of cure are founded chiefly on obſolete theories. Speaking of pains in the breaſt and ſide, with difficult reſpiration, he ſays, "Bleeding and "bliſters in that caſe are not only without any "utility, but hurtful in a high degree, although "all theſe appearances indicate an inflammation "of the breaſt. I have found attended with "great ſucceſs, bags filled with the emollient "herbs boiled in vinegar applied continually to "the breaſt, and anointed twice a day with "camphorated ſweet oil of almonds: every hour "the patient took two ſpoonfuls of the follow-"ing mixture:

R Gum. Guajac	Drachm. i
—— Arab.	Drachm. ii
Aq. fœnicul	Unc. vi
Oxymel Scillit	Unc. i.
M.	

For

"For common drink he took a decoction of "the roots of marſh mallows, with ſimple oxy- "mel." This practice needs no comment; it will certainly never be imitated by Britiſh Navy ſurgeons, if they can get freſh fruits or herbs.

The Earth Bath, as it is called, has been ſaid to give very material relief to the contracted hams and hardened limbs of ſcorbutics, by ſoftening the ſkin and promoting perſpiration. This practice has undeſervedly gained credit like ſome others; for when you can command an Earth Bath, freſh vegetables can be alſo procured: ſo that if it happened to be uſed while they were ſerved to the patient, the bath has been commended for the cure, and the vegetables forgot; but we have no fact to aſſure us that it ever cured the Scurvy by itſelf. The cuſtom ſeems to have originated from the ſailors burying their limbs in warm ſand on the ſhore,

from

from which they apprehended ſome eaſe was procured.*

It would lead us into a very fruitleſs criticiſm to recount the different medicines met with in books, and their pretended effects in the cure of Scurvy: we are ſorry to ſee ſome late valuable publications disfigured by the introduction of inſignificant remedies.—The fact cannot be too often repeated, and ſtrictly attended to; that nothing is to be depended upon for the cure of Scurvy, but vegetables in a *recent* ſtate, and theſe will be found to be the more valuable, as they approach and poſſeſs an *acid quality*.

Having given a particular deſcription of the Scurvy as it occurred in a ſlave ſhip; it is a

* This was firſt practiſed by the ſailors in Admiral Hoſier's fleet.

tribute

tribute due to humanity to offer ſome means of prevention ſuited to theſe ſituations.

The moſt knowing in this trade are aware of how much conſequence it is to complete their numbers as ſoon as poſſible; therefore a ſhip that is fitted to carry from three hundred to three hundred and fifty ſlaves, is preferable to a larger one, as leſs endangering their health, from confinement in the ſhip, and lying long on the coaſt. The diet ſhould be in no greater proportion than to keep them in good condition. Ships in the road of Anamaboe, at the time we were buying our Negroes, had them as long on board, but by pampering them leſs, preſerved them healthy and free from Scurvy. This ſpare diet ſhould be continued till they are about to leave the coaſt, when it may be increaſed. The utmoſt attention ought to be paid to the qualities of their food: the corn rooms ought to be very often inſpected, and

airy

airy as poſſible; the corn, rice, and beans ought to be carried frequently on deck, to prevent them growing damp and mouldy. Theſe articles need a great deal of boiling to render them eaſy of ſolution in the ſtomach, and Guinea pepper may be mixed with them in large quantity: it is ſeldom they complain of their food being too hot; as it is one of the beſt condiments for a vegetable diet, there can be no doubt, but it muſt obviate many complaints of the bowels that are apt to follow ſuch flatulent fare. Palm oil is another condiment uſed by the natives of Africa in great quantities; for it certainly very much aſſiſts the aſſimilation of the chyle, and increaſes in a high degree the nutritive qualities of vegetables. The fruits of the climate, ſuch as pine apples, lemons, oranges, whenever they can be procured, may be diſtributed among them. On leaving the coaſt a ſhip ought to be well provided with all the fruits and vegetables in ſeaſon. The paſſage of a Guineaman to the Weſt Indies, is ſeldom ſo long, but lemons,

limes, and oranges may be preſerved all the way; but if there is danger of a long paſſage, the juice can be preſerved in bottles well corked as formerly directed. There are many inſtances, where, from a ſcarcity of water in long paſſages, the Scurvy ſeemed to make its appearance when very little expected; in theſe ſituations a few caſks of lime juice, might have ſaved ſome thouſand pounds to the owners, and the lives of the poor wretches who periſhed. Exerciſe is of the greateſt importance in preſerving the health of the ſlaves, and no more ought to be ſhackled than what the ſafety of the veſſel requires. They may likewiſe be encouraged to dance, which, beſides the exerciſe it affords, tends to amuſe them; diverts their ideas, and makes them more cheerful; but all this muſt be done by gentle means: the laſh of a cat-and-ninetails may force a man to run and leap about, but the feelings will brood over the ſmart afterwards. For throwing freſh air into the rooms, windſails are much preferable to the ſmall ſkuttles in the

ſide

ſide of the ſhip, becauſe they are generally ſhut at ſea when the rooms are moſt full. The decks and platforms below where the ſlaves lie, ought to be kept as dry and clean as poſſible; after being waſhed great care ſhould be taken to have them well dried with ſtoves while the ſlaves are on deck, for any dampneſs would be hurtful. To all theſe rules it is neceſſary to add, that the moſt lenient means ſhould be employed to keep them in order; great addreſs is often wanted on ſuch occaſions; but ſeverities are ſubſtituted, and few think that they are trampling on the Rights of a Man and a Brother!

FINIS.

ERRATA.

Page xiv. lege *Nullius addictus jurare in verba magiſtri*

Page.	Line.	
63	2	lege *Stoical*
93	4	*for* to, *lege* for
164	15	*lege* effected
211	note,	lege *Humanum*
221	18	*lege* affected
231	19	*lege* expectorants.